Tentative Translation

JST-Mirai Program

(Small-start type / Large-scale type)

FY2019

Application Guideline

Solicitation Period

Wed., May 15, 2019– Wed., July 24, 2019 at 12:00 noon

Department of R&D for Future Creation

国立研究開発法人
科学技術振興機構
Japan Science and Technology Agency

May, 2019

<Main Schedule>

R&D proposal acceptance begins	Wed., May 15, 2019
Briefings of Solicitation	Check the page on call for proposals at the Department of R&D for Future Creation's website for updated information. https://www.jst.go.jp/mirai/jp/open-call/research/r01/
Application deadline (Deadline for submitting applications through the e-Rad system)	Wed., July 24, 2019 at 12:00 noon (Japan time) *No delays accepted

Application of proposal is implemented via e-Rad system (https://www.e-rad.go.jp/). Researchers who do not have an e-Rad login ID and password should immediately complete the researcher registration procedure. As the application deadline approaches, heavy demands on the e-Rad system could slow the application process and even cause the application deadline to be missed. Please give yourself enough time to complete submission of proposal.

No proposal for which the application procedure has not been completed via e-Rad by the deadline is subject to examination for any reason.

Document screening period	Early-August to Mid-September
Interview screening period	Late-August to Early October
Notification/announcement of selected proposals	Early-November
R&D project begins	After Early-November

* The dates are expected dates. They are subject to change.
* Specific interview selection schedule will be determined by JST.
* As soon as it is determined, the document screening and the interview selection schedule will be announced on the public invitation page the website shown below:
  https://www.jst.go.jp/mirai/jp/open-call/research/r01/

<R&D Areas for which Proposals will be Solicited>

Under the Application Guideline, 2019 JST-Mirai program will invite R&D proposals as follows.

Period for submitting proposals:

Wed., May 15, 2019 – Wed., July 24, 2019 at 12:00 noon (No delays accepted)

No proposal for which the application procedure has not been completed via e-Rad by the deadline is subject to examination for any reason.

R&D Type	R&D Areas for which Proposals will be Solicited
Small-start type (Feasibility Study)	**"Realization of a Super Smart Society (Society 5.0)" area** (R&D Supervisor (Program Officer; PO): Akira MAEDA) Innovative AI technologies for Sophisticated Integration of Cyber and Physical World (New)
	"Realization of a Sustainable Society" area (R&D Supervisor (PO): Hideyo KUNIEDA) 1. Creation of innovative food production technologies responding to future changes in climate and social demands 2. Enhancement of product durability and usability for resource-efficient society (New)
	"Realization of the Most Safe and Secure Society in the World" area (R&D Supervisor (PO): Ken-ichi TANAKA) 1. Realization of a safe, secured, and comfortable town by removing a slight amount of hazardous substances hiding in living environments 2. Self-management for health based on the action mechanism of daily behaviors such as food, exercise and sleep (New)
	"Realization of a Low Carbon Society, a global issue" area (R&D Supervisor (PO): Kazuhito HASHIMOTO) Realization of a low carbon society through game changing technologies
	"Common Platform Technology, Facilities, and Equipment" area (R&D Supervisor (PO): Nobuyuki OSAKABE) Realization of Common Platform Technology, Facilities, and Equipment that creates Innovative Knowledge and Products
Large-scale type	(R&D Supervisor (PO): Yoshihiro OISHI) Innovative Thermoelectric conversion technologies for stand-alone power supply of sensors (New)

<Public Briefing Session>

Public briefing sessions in 2019 will be held. Please refer to following website.

https://www.jst.go.jp/mirai/jp/open-call/research/r01/

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Chapter 1

Introduction:

Invitation to Submit Research Proposals

1.1 JST-Mirai Program

1.1.1 Overview of JST-Mirai Program

Today, new knowledge and ideas can have a great influence on the international competitiveness of organizations and nations. It is important to boldly attempt new experimentation and promote high-risk and high-impact research and development (R&D) that will yield important innovations. The Fifth Science and Technology Basic Plan states that, "Japan will popularize and disseminate suitable methods for promoting challenges" in the R&D projects conducted by the government ministries. Japan demands the large-scale promotion of new, profitable creations that can assist in the building of future industries and in reforming society; specifically, it is seeking the "realizing a world-leading super-smart society (Society 5.0)."

In response to the goals mentioned above, JST commenced the JST-Mirai program in 2017.

By considering the social and industrial needs (including potential ones), this program will set technologically challenging goals with clear targets (exits) designed to produce beneficial economic and social impacts. In an attempt to reach a stage (proof of concept: POC) where application feasibility may be judged, the R&D for prospective projects will take advantage of the promising results produced by prior programs such as "Strategic Basic Research Program" and "Grants-in-Aid for Scientific Research." This R&D will adopt operation practices that allow innovative ideas to be readily incorporated and rapidly, flexibly, and swiftly brought to commercialization.

The JST-Mirai program facilitates two different project approaches: "Small-start type" and "Large-scale type."

In Small-start type, R&D, in principle, proceeds stepwise from a feasibility study to full-scale research. To evaluate the feasibility of the ideas proposed, feasibility studies will adopt the small-start method*[1] and incorporate many innovative ideas through calls. R&D themes will be called for in the areas*[2] stipulated by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and along with the "Prioritized Themes" JST has chosen.

The Large-scale type involves collecting and analyzing information on science and technology innovations and changes in existing technology systems. Investment will be concentrated towards R&D projects that relate to "Technology Themes" that have been judged by MEXT as important for forming the bases for future technologies.

The JST-Mirai program applies a stage-gate method*[3]. When considering Small-start type, R&D projects that can transition from feasibility study to full-scale research will be prioritized and invested in. Similarly, through narrowing down the research projects currently underway, the most suitable R&D projects will be chosen for concentrated investment. It should also be noted that Large-scale type requires the sourcing of private funds and investment during the R&D phase to facilitate investment of private funds.

*1 The small-start method: A system for adopting a large number of R&D projects despite relatively little funding being available at the time of adoption.
*2 Area: “Area selected when setting Prioritized Themes (divisions).”
*3 Stage-gate method: A system in which R&D is divided into a number of stages, with an evaluation conducted at each stage to decide whether to continue with the project or cancel it.

1.1.2 Purpose and characteristics of JST-Mirai program

The rapid development of digital technologies combined with progress in open innovation has forced the global structure for creation of innovation to undergo great changes. Society and industries are at a great turning point in Japan. In the era of great reformation that is now in progress, the JST-Mirai program sets a goal for “what research Japan should conduct and what strategic research Japan should strengthen in a style of challenging innovation creation to keep yielding new values.”

JST takes into account such social and industrial issues and the creation of new industries to connect the government, universities, and industries in a wide range of fields from basic research to application, challenge the technologically extremely difficult research for the presently unclear market, and manage JST-Mirai program while being intensely conscious of permitting failures and teaming up with you to succeed in the realization of an “innovative eco-system” that keeps creating innovation.

1.1.3 Important matters of the JST-Mirai program and characteristics of its management

(1) Focus on “new value” creation by R&D that meets the purpose of Prioritized Themes and Technology Themes

- Concrete forms of values that the society seeks

The JST-Mirai program depicts a future society to practice back cast type R&D to realize science and technology for society.

This project takes two approaches to define an image to be sought as a new value for society.

One is an approach (the Small-start type) for JST to define new values (Prioritized Themes) the society and industries seek through “calling for theme proposals” * by taking into account the areas set by the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

The other one is an approach (the Large-scale type) through which the Ministry can collect and analyze information about science and technology innovations, alter the existing technology system, and specify technologies (Technology Themes) to be the future base technologies.

R&D in this program is performed to realize the Prioritized/Technology Themes.

* Calling for theme proposals:

This program took the approach of calling for a wide range of proposals about the

future image to be realized by science and technology (continuing throughout the year). Prioritized Themes were examined through calling for proposals until March, 17, 2019.

- Themes for attempting various mergers

Prioritized Themes and Technology Themes are yielded through the examination of various values that society and industries seek. Therefore, the themes are set to encourage collaboration and cooperation among various organizations and researchers to merge science and humanity fields. The themes are also set to keep in mind the social implementation of realized values and to solve complex issues.

R&D proposals for program that takes into account these points are called for.

- R&D management by R&D supervisor

Appendix Application Guideline, Chapter 6 "Prioritized Theme and Technology Theme for Research Proposals" (https://www.jst.go.jp/mirai/jp/uploads/application-guideline- r01-c6.pdf) explains the outline of Prioritized Themes and Technology Themes and the R&D supervisor's policies for proposal selection and management. Take into account the outlines and messages to prepare a proposal for this program. Base technologies common to measurements and determinations may be proposed for any Prioritized Theme.

The R&D supervisor aims for early completion of an R&D portfolio for each area and Prioritized Theme and makes announcements as necessary for public calls.

(2) Reponsibilities and expectations for the Principal Investigator* and R&D institution

*The Principal Investigator is responsible for cooperation with R&D institutes to provide an R&D site and research environment necessary for R&D promotion. As explained below, Principal Investigators in each type of programs are called Project Leader (PL) for the Small-start type and Program Manager (PM) for the Large-scale type.

- Expectation for setting the POC toward the realization of excellent ideas and values

The JST-Mirai program conducts R&D for reaching "a stage where application feasibility (proof of concept: POC) may be judged" that is necessary to realize Prioritized Themes and Technology Themes. The POC is set as a point for solutions based on core social and industrial problems for realizing Prioritized Themes and Technology Themes. The POC is set on the basis of activities of the society and private firms to whom the POC is passed after it is attained, and on ideas for overlooking its ramifications.

The Small-start type selects Principal Investigators (project leader: PL) across Prioritized Themes in each area under an R&D supervisor through public calling, and the PL promotes research. A PL promotes R&D based on original and challenging ideas under flexible management by the R&D supervisor. An active approach is expected that accurately grasps social and industrial needs to improve feasibility.

The Large-scale type selects Principal Investigators (program manager: PM) through public calling who have excellent ideas and are boldly given the authority. A PL, as an R&D producer, chooses researchers. She/he is expected to recruit top-level knowledge in Japan.

The Principal Investigator takes into account the prior evaluation and coordination with an R&D supervisor to set the POC (and milestones) and conducts R&D to aim to achieve it. During R&D, the Principal Investigator may flexibly review an R&D plan and form a team (including public calling for proposals) upon approval of the R&D plan by the R&D supervisor.

- Improving support systems

The R&D institute is requested to provide proper support for the promotion of R&D, for example, dispatching aides to assist R&D management by a Principal Investigator; setting up an intellectual property management committee associated with the creation, protection, and utilization of intellectual properties (see "(4) Promoting Industry-Academia Collaboration"); and supporting collaboration among the R&D institutes. JST also cooperates in building a support system.

- Positive participation and achievement of young researchers

We recommend a creativity rich study to challenge, expect a match with the various fields of learning of humanities and science, and diversity in age and gender in particular. Therefore, in view of many of the researchers who gave excellent study results worldwide which becomes a basis of the outcome, the positive participation of the young excellent researchers are recommended who will carry the future of science and technology of our country. In this program, it's recommended that researchers of the young people of industry-university-government work on management of research and development as the representative personnel of research and development. JST also supports management training for research and development as needed. We're waiting for many R&D proposals from young generation more than ever who have innovative and excellent ideas and techniques. We hope that R&D principal investigator will actively call for participation by the young researchers who have innovative and excellent ideas and techniques.

- Changing the Principal Investigators

Challenging and highly creative research is encouraged. So, it is needed to involve people with knowledge in diversified fields of science and humanities, generation, and gender. It is also considered necessary to allow dynamic changes in the priority of R&D contents in the integrated management of basic and applied research during a set period for realizing values that the society and industries seek, or achieving their social implementation.

To put those into effective practice, the Small-start type allows changes of Principal

Investigators (Project Leader; PL). Sharing roles with aides is also presumed to be a form of good practice. Continuous management by a Principal Investigator (Program Manager; PM) is a principle followed in the Large-scale type. However, changing PMs is also allowed at a proper time during an R&D period for the reason that R&D is to continue under the condition of inducing private fund investment and a plan to lead to development after the POC, and a viewpoint of human resource development are taken into account for securing the continuation and development of the initial ideas. An R&D management committee decides on the PM changes upon receiving advice from an R&D supervisor.

(3) Flexible and "thorough" R&D

- Spiral and flexible research promotion

The JST-Mirai program allows a "spiral model" of R&D in addition to that of a "linear model" that presumes reaching the POC from the seeds of basic research to applied research. For example, it allows timely responses, such as basic research conducted for solving issues appearing during R&D and a team for it to be formed (including public calling), new technologies and findings to be introduced, society and industries to respond to constantly changing needs, the results of some R&D to spin out, and collaboration with other organizations and ELSI to be responded to.

To improve the likelihood of reaching the POC and maximize results for any approach, R&D supervisors and JST staff examine progress in detail in addition to staging gate evaluations to perform an intense management.

- Stage gate implementation

The JST-Mirai program performs a "stage gate evaluation" during the R&D period, which is a strict evaluation for judging whether to continue or revoke R&D from the viewpoint of the likelihood of reaching the POC. Papers and patents are utilized as evidence for judging the feasibility of reaching the POC.

The Small-start type adopts many small start R&D projects that have relatively small R&D budgets and aim to verify research plans, necessary technology, and research elements toward meeting the requirements for carrying out full-scale R&D (small starts), and prioritizing projects that have passed the stage gate evaluation as large-scale R&D (stage up).

Concerning projects that do not reach the stage up but can contribute to other projects for reaching the POC and the component research and technologies, the Small-start type may take into account the challenges of the highly original research and attempt to merge with other projects or utilize them as component research.

The Small-start type may also continuously survey and examine the potential of component research and technologies that are likely to make important contributions to the realization of Prioritized Themes in the future.

The Large-scale type performs a first stage gate evaluation of approximately three years of R&D initiation when subsequent R&D activities are conducted from the viewpoint of inducing private fund investment. Be sure to see, "2.2 (3) 8) Stage gate evaluation" for the Large-scale type.

The likelihood of reaching the POC is improved by research and its results through these approaches and an attempt is made to accelerate R&D toward social implementation.

(4) Promoting Industry-Academia Collaboration

- Basic policies set out for managing intellectual properties

The JST-Mirai program has decided to connect R&D results to values for economic and social impacts in order to obtain secure and effective rights for the results in order to maintain reliability and superiority.

For this purpose, JST sets out basic policies common to this program, "Basic policies for the management of intellectual properties," to attempt to integrate activities for R&D and intellectual properties and encourage the preparation of integrated policies for obtaining rights, announcement, non-disclosure, and utilization of results.

Principal Investigators need to establish the mutual agreement "Treaty of mutually owned intellectual properties," which complies with the basic policies agreed with participating organizations and researchers. This treaty needs to be submitted to JST and the R&D supervisor within a certain period of time of research initiation and its review results will be used to judge whether R&D should be conducted.

Promotion of R&D based on basic policies is expected to strengthen collaboration and bridging with society and industries.

The basic policies are provided separately. See below for contents and details.
https://www.jst.go.jp/mirai/jp/manual/index.html

1.1.4 Management system for the JST-Mirai program

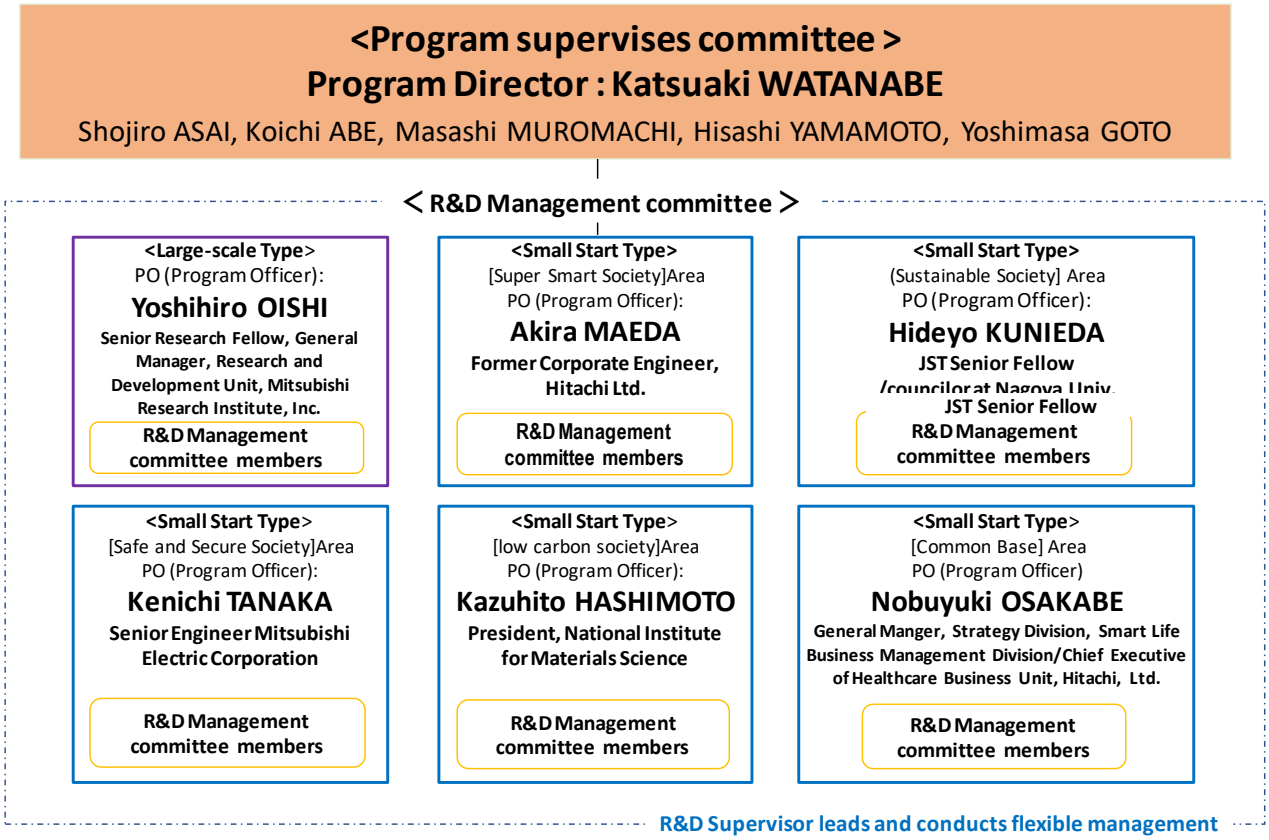
The PD (program director) supervises the whole JST-Mirai program for overall, and POs (Program Officer, R&D supervisor) are in charge of R&D area management (illustration below).

The "Program supervisors committee for the JST-Mirai program" has been set up as a supreme organization for managing the JST-Mirai program. The PD chairs the program supervisors committee, in which outside experts and JST executive director in charge participate as committee members.

The program supervisors committee reviews the important management matters for the JST-Mirai program: it decides on the important policies of the program, sets Prioritized and Technology Themes, coordinates cross-disciplinary matters including

budgets, selects project candidates, and decides whether to continue or to revoke projects on the basis of stage gate evaluations.

Each R&D supervisor (PO), who chairs the committee, her/his aides, outside gurus, and JST staff participate as members of the R&D management committee. This committee sets Prioritized Theme candidates (only the Small-start type), selects candidate projects for adoption, instructs and manages R&D projects, and performs stage gate evaluations. An R&D supervisor (PO) also increases or decreases the amount of R&D costs, merges projects, and revokes projects through evaluation.



* Each Small start Type Area has a Prioritized Theme. R&D project are promoted under each prioritized theme.
* Large-scale Type has several technological themes. R&D project are promoted under each technological theme.

Fig. Organization of JST-Mirai program

1.2 Researchers Considering Applying for /Participating in the Program

1.2.1 Contribution to achieving Sustainable Development Goals (SDGs)

JST contributes to achieving sustainable development goals (SDGs)

At the UN Sustainable Development Summit held in September 2015, the outcome document **"Transforming Our World: the 2030 Agenda for Sustainable Development"** was unanimously adopted. The outcome document focuses on Sustainable Development Goals (SDGs) as the more comprehensive new global action targets for humanity, the planet and prosperity. The 17 goals of the SDGs not only indicate challenges on sustainability faced by the humanity, but also require these challenges to be solved in an integrated and inclusive manner. To this end, it is hoped that innovation in science and technology will solve these social issues and provide a scientific basis for making better policy decisions. These roles agree with the new responsibilities of science, i.e., "Science in Society and Science for Society" set forth in the "Declaration on Science and the Use of Scientific Knowledge" (Budapest Declaration*) adopted by the International Science Council in 1999. As a core organization promoting Japan's science and technology policy, JST promotes cutting-edge basic research and is engaged in problem-solving R&D to meet the needs of society. SDGs are universal goals that can cover JST's mission. JST will co-create values with the industry, academia, government, and public through its projects, and work with the researchers to achieve a sustainable society.

Michinari HAMAGUCHI
President, Japan Science and Technology Agency (JST)

* The Budapest Declaration states that "Science for Knowledge," "Science for Peace," "Science for Development" and "Science in Society and Science for Society" are the responsibilities, challenges and obligations of science in the 21st century.

○See the website below for Sustainable Development Goals and JST's approaches:
https://www.jst.go.jp/sdgs/actionplan/index.html (Japanese)
https://www.jst.go.jp/sdgs/en/actionplan/index.html (English)


SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

1.2.2 Promotion of diversity

JST Promotes Diversity!

The diversity is an essential requisite for promotion of scientific and technological innovations. It is possible to open a new perspective of science and technology by the collaboration and discussion among various stakeholders having different specialties and values, irrespective of gender and nationality.

JST, by promoting advances in diversity in its all activities in science and technology, is undertaking possible problems of our future society, contributing to the strengthening of industrial competing power of Japan as well as to the enrichment of spiritual happiness of people. Our activities in this field are in accord with the “Sustainable Development Goals (SDGs)” agenda of the United Nations, in which goals relevant to diversity advancement are shown, including gender equality, contributing to efforts on our domestic problems but also to those on problems common to various countries.

Currently, the activity of woman is being positioned at the core of the Growth Strategy of the Japanese Government, being started as “the largest potential of Japan” in the strategy paper. Expending the participation of woman researchers in research projects is substantially important for advancing research and development, as they are a part of various researchers supporting science and technology innovations. JST is expecting that woman researchers would take this opportunity, positively and will apply to our Strategic Basic Research Programs, actively. JST is undertaking the improvement of our “Childbirth, Child-raising, Nursing Care Support System”, based on the voice of the system users, to constantly creating environments enabling a researcher on leave to return to his/her research, for example.

The call for and review of research proposals will be conducted also from a viewpoint of advancing the diversity. Our dear researchers, we cordially invite you to the call for research proposals of the Strategic Basic Research Programs.

Michinari HAMAGUCHI
President, Japan Science & Technology Agency (JST)

We Are Waiting for Your Application!

JST is promoting diversity in research, based on our perspective that the diversity is for understanding of other researchers having ideas different from yours, and for creation of new values by combining your and their ideas. The diversity thus has the potentials to give solutions not only to the domestic problems but also to problems common in all nations across the world. Therefore, JST is undertaking the societal problem of the globe such as the Sustainable Development Goals (SDGs) through the promotion of diversity in research and collaborating with foreign institutions.

JST is promoting the diversity by ensuring the activities of women researchers, of course young researchers, and researchers with foreign citizenship. To ensure that each researcher is fully able to exercise his/her skills, JST is providing continual supports for childbirth, childcare, and homecare of elderly relatives, and also endeavoring to maintaining a balanced membership composition in committees and alike. JST especially welcomes the application of women researches to our program, from whom we cannot have so many research proposals in previous years, to realize environments where various kinds of researcher can work, cooperating and competing with each other. Through these activities, JST is pursuing the creation of new values.

We are sincerely waiting for your active applications, especially those form woman researchers.

Miyoko WATANABE
Deputy Executive Director and Manager, Office for Diversity and Inclusion, Department of Strategic Planning and Management, Japan Science and Technology Agency (JST)

1.2.3 Towards the promotion of fair research

Towards the Promotion of Fair Research

Recent incidents involving misconduct and dishonesty in research activities have resulted in an alarming situation that threatens the relationship of trust between science and society, and hinders the healthy development of scientific technologies. To prevent misconduct in research activities, there must be a concept of self-purification in the scientific community. Each researcher must strictly adhere to strict discipline and work to create new knowledge and inventions that are useful for society, based on high moral standards that meet the expectations of society.

As a funding agency for research, the Japan Science and Technology Agency (JST) considers research misconduct to be a grave issue and makes every effort to prevent it in cooperation with relevant organizations, with the goal of regaining public trust.

1. JST believes that honesty in research activities is extremely important for Japan, which seeks to develop itself through science and technology.
2. JST supports honest and responsible research activities.
3. JST strictly condemns any misconduct in research activities.
4. JST will promote education in research ethics and reform its research funding programs in cooperation with the relevant organizations in order to prevent misconduct.

We must develop a healthy scientific culture based on social trust, so as to build a society filled with hopes and dreams for a bright future. We therefore request the continued understanding and cooperation of the research community and related institutions.

Michinari HAMAGUCHI
President, Japan Science & Technology Agency (JST)

1.2.4 Open access and data management plan

JST announced the basic policies for handling research achievements towards the promotion of open science in April 2017. The policies stipulate the basic concepts for allowing one's access to papers on research achievements and archiving, as well as on managing and disclosing research data.

In principle, researchers participating in this program are mandated to make the produced documents on research achievements available to the public via the repository organizations or publications for open access. Researchers are also requested to prepare a data management plan. This plan will contain details on policies and plans for archiving, managing, and publishing, or the non-disclosure of research data, which are being developed for achievements. Researchers must also submit the plan, along with the research plan document to JST. It is also mandatory for them to undertake archiving, managing, and publication of research data based on this plan.

Please see the following for details:

○ JST's basic policies for handling research achievements toward an open science promotion
https://www.jst.go.jp/all/about/houshin.html#houshin04

Chapter 2

Call for Proposals and Selection

(Small-start type and Large-scale type)

2.1 Small-start type

2.1.1 Concerning the Small-start type

(1) Target areas and Prioritized Themes for call

R&D Type	R&D Areas for which Proposals will be Solicited
Small-start type (Feasibility study)	**"Realization of a Super Smart Society (Society 5.0)" area** (R&D Supervisor (Program Officer; PO): Akira MAEDA) Innovative AI technologies for Sophisticated Integration of Cyber and Physical World (New)
	"Realization of a Sustainable Society" area (R&D Supervisor (PO): Hideyo KUNIEDA) 1. Creation of innovative food production technologies responding to future changes in climate and social demands 2. Enhancement of product durability and usability for resource-efficient society (New)
	"Realization of the Most Safe and Secure Society in the World" area (R&D Supervisor (PO): Ken-ichi TANAKA) 1. Realization of a safe, secured, and comfortable town by removing the slightest amount of hazardous substances hiding in the living environments 2. Self-management for health based on the action mechanism of daily behaviors such as food, exercise and sleep (New)
	"Realization of a Low Carbon Society, a global issue" area (R&D Supervisor (PO): Kazuhito HASHIMOTO) Realization of a low carbon society through game changing technologies
	"Common Platform Technology, Facilities, and Equipment" area (R&D Supervisor (PO): Nobuyuki OSAKABE) Realization of Common Platform Technology, Facilities, and Equipment that creates Innovative Knowledge and Products

(2) Outline of the Small-start type

The JST-Mirai program has set images of the future society that can be achieved through developments in science and technology, or through creating new values sought by society and industries, as Prioritized Themes, and is requesting research ideas from researchers affiliated with universities, business firms, public research organizations, and select Principal Investigators (Project Leader: PL) (See Appendix Application Guideline, Chapter 6 "Prioritized Theme and Technology Theme for Research Proposals" https://www.jst.go.jp/mirai/jp/uploads/application-guideline-r01-c6.pdf).

[Characteristics of Small-start type R&D]

- The PL is affiliated with a university, business firm, or public research organization.
- R&D is pursued up to a stage (POC) where application feasibility can be judged, and then research results are actively submitted to business firms and society.
- The R&D proceeds stepwise, or from feasibility study to full-scale research (small-start method*[1]). During the small-start stage, an R&D plan for full-scale research is examined in order to adequately judge the feasibility of the research idea before allowing the project to proceed towards full-scale research.
- A stage-gate method*[2]is applied in order to narrow down R&D projects eligible for proceeding from the small-start stage to full-scale research and then becoming full-scale R&D projects. Then, optimum R&D projects are provided with concentrated investment.

*1 Small-start method: A mechanism for selecting a large number of projects despite a relatively small budget being available at the time of adoption (the research scale is expanded when the research passes stage-gate evaluations). (reposted on page 2)

*2 Stage-gate method: A system in which R&D is divided into a number of stages, with an evaluation conducted at each stage to decide whether to continue with the project or cancel it. (reposted on page 2)

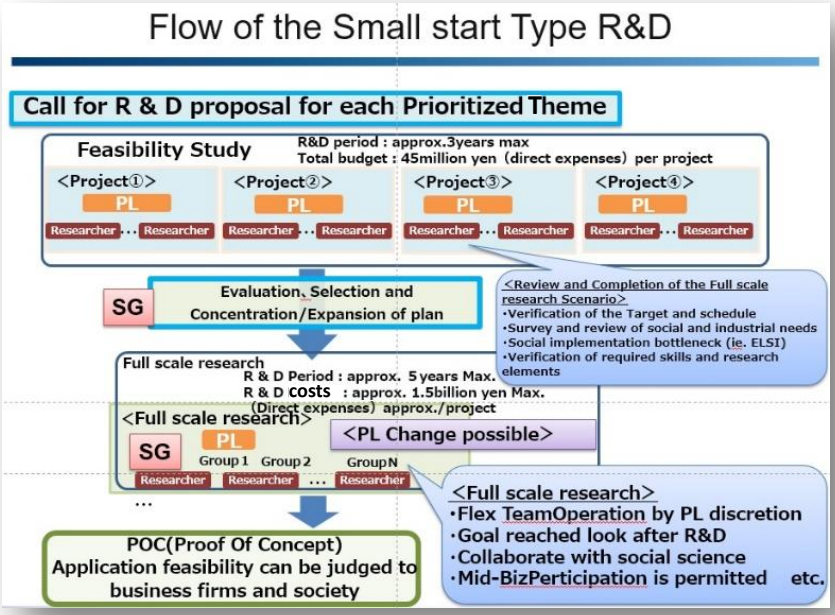


Fig. 1 Outline of the Small-start type

(3) Mechanism of Small-start type

1) Research for Small-start type (Feasibility study and Full-scale research)

The Small-start type adopts a small-start method. The PL conducts feasibility study and then advances to full scale research after passing a stage-gate evaluation.

We are requesting proposals for Small-start type R&D projects.

Feasibility Study:

During the research stage of a feasibility study (FS), the PL should examine a full-scale research plan (including topics such as: verifying component technologies necessary for conducting full scale research, verifying the social and economic impacts of POC, identifying the challenges for implementation into society, and creating a plan of necessary activities to be conducted after reaching POC) in order to judge the feasibility of conducting prospective full scale research.

Upon completion of feasibility study, JST performs stage-gate evaluations (specified by an R&D supervisor) to decide whether the research should be allowed to proceed to full-scale research or be cancelled. Depending on the judgement of the R&D supervisor, a number of R&D projects may be merged to form full-scale research projects.

Feasibility Study (Component-technology type):

In addition to the proposals of research ideas for the transfer to full-scale research as described above (General type), some of the Prioritized Themes invite the proposals of component technologies that contribute to achieving Prioritized Themes as the “Feasibility Study (Component-technology type)”.

We would like to ask the PL who performs the R&D of the “Feasibility Study (Component-technology type)” to embark on the development of component technologies for introducing the results into a full-scale research to be conducted under this Prioritized Theme. For such a purpose of the Component-technology type, proposals of novel ideas by young researchers are expected.

Although the research proposal is Component-technology type when approved, the proposal may be subject to change into general type during R&D period through evaluation equivalent to the general type, when R&D Supervisor finds it necessary.

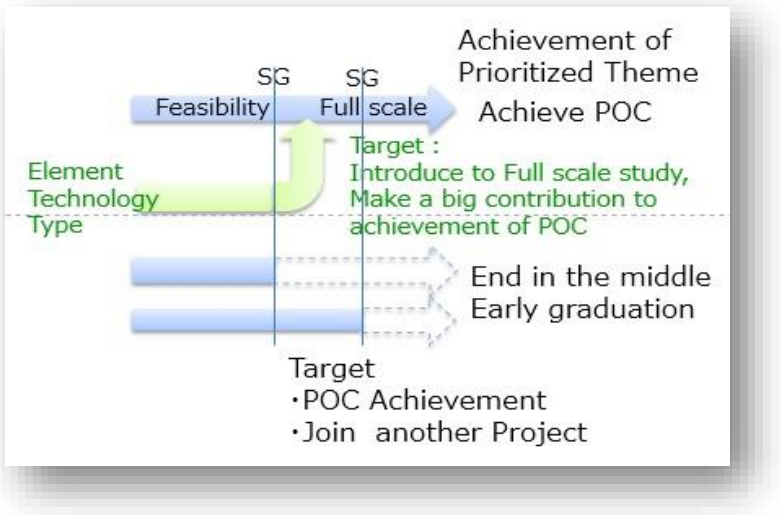


Fig. 2 Image of the Small-start type research (Component-technology Type)

A Prioritized Theme requesting for the proposals of the “Feasibility Study (Component-technology type)” can be confirmed at Appendix Application Guideline, Chapter 6 "Prioritized Theme and Technology Theme for Research Proposals" (https://www.jst.go.jp/mirai/jp/uploads/application-guideline-r01-c6.pdf)." However, for this year, we are requesting proposals for following theme.

“Common Platform Technology, Facilities, and Equipment” area
All sub Prioritized Theme：Realization of Common Platform Technology, Facilities, and Equipment that creates Innovative Knowledge and Products

For matters not specifically described in the application guidelines, Feasibility Study (Component-technology type) will call for proposal, selected, and conducted research and development with the same treatment as in ordinary “Feasibility Study.”

Full scale research:

The PL shall promote R&D activities toward achieving POC goals in consideration of the implementation of the results into society and its further development after completing R&D. Please see “2.1.2 (6) Selection viewpoints” for the Selection Standards (Preliminary Evaluation Standards) for the Feasibility Study and Supplement to selection standards for the Small-start type.

2) R&D costs and periods

R&D costs and time periods are set for each Prioritized Theme. Be sure to see Appendix Application Guideline, Chapter 6 "Prioritized Theme and Technology Theme for Research Proposals (https://www.jst.go.jp/mirai/jp/uploads/application-guideline-r01-c6.pdf)" before deciding on an R&D plan. JST pays R&D costs (direct costs) and indirect costs (a maximum of 30% of the direct costs) to the research organization on the basis of the R&D agreement made.

3) R&D system

We ask that the PL form an optimum R&D team composed of a number of researchers (a proposal may be submitted before the team is formed). In the case of “Feasibility Study (Component-technology type)” proposal, individual research suggestions are also accepted.

a. The PL may establish a group (“joint research group”) consisting of researchers affiliated with other laboratories or research organizations, if necessary, for realizing R&D ideas, in addition to a “PL group” composed of members of her/his own laboratory.
b. Representatives of the members of a “Joint Research group” are referred to as “Lead Joint Researchers.”
c. Depending on research progress, the PL is allowed to employ as many researchers and assistant researchers the budgeted R&D costs will allow (this budget is stipulated within the R&D agreement with the research organization) for participation in R&D.

See “2.1.2 Proposal selection for Small-start type research, (5) Requirements for application” for requirements concerning research teams.

(4) Flow of R&D management in Small-start type

1) Proposal selection for small-start projects

JST is recruiting R&D proposals for each Prioritized Theme in the area stipulated by the government. An R&D proposal of the Small-start type, including a clear statement of the POC to be reached and the contents of full-scale research, should be submitted. The entire program shares information and collaborates to select projects for each Prioritized Theme.

However, in the case of a proposal for “Small-start type research (Component-technology type)”, we will propose a research and development plan after clarifying the reason for contributing to the Prioritized Theme.

Members of the R&D management committee cooperate with the PL during the selection process (see “2.1.2 Proposal selection for Small-start type research (6) Selection viewpoints” and “2.3.3 Selection method” for details).

2) Preparation of an R&D plan for an accepted proposal

The PL should prepare a full research plan representing the entire period of the accepted small-start research. The PL should also prepare an annual research plan for each year. The plans should contain R&D costs and R&D system.

3) Agreement

After adopting a proposal, JST, in principle, concludes an R&D agreement with the research organization that the PL and the main joint researchers are affiliated with.

4) Executing research

In principle, research must be performed over two and a half years, from November 2019 to March 2022.

* A research budget and period are set for each Prioritized Theme. See Appendix Application Guideline, Chapter 6 "Prioritized Theme and Technology Theme for Research Proposals (https://www.jst.go.jp/mirai/jp/uploads/application-guideline-r01-c6.pdf)”

before preparing an R&D plan.

5) Evaluation

The R&D supervisor should determine the progress and results of research, receive cooperation from members of the R&D management committee, and make evaluations at stage gates and upon the completion of the R&D project.

<Evaluation of R&D projects>

a. The R&D supervisor should be able to gain an understanding of the progress and results of the R&D and should receive cooperation from members of the R&D management committee in order to be able to make evaluations concerning the transferring of small-start research to full-scale research (stage-gate evaluation). These evaluations will be conducted at stage gates of full-scale research, and upon its completion. Stage-gate evaluations are conducted in the third year of full-scale research and evaluations at completion are made as soon as the R&D is completed, or at a proper time before the completion, depending on the nature and progress of the R&D. R&D Projects of the "Small-start type research (Component-technology type)" will carry out ex-post evaluation instead of evaluation for transition from feasibility study to full scale research (stage-gate evaluation).
b. In addition to the above, the R&D supervisor may evaluate R&D projects whenever she/he judges it to be necessary.
c. Changes in coordination or resource distribution (increases or decreases in R&D costs and reviews of R&D group compositions) are reflected in the results of project evaluations. Depending on the evaluation results, R&D projects may be finished sooner (i.e., cancelled) or merged or integrated with other projects.
d. A certain period after the completion of R&D, a follow-up survey is conducted concerning the development and utilization of the R&D results and the activities of participating researchers. On the basis of these survey results, experts selected by JST perform a follow-up evaluation.

Besides evaluating of R&D projects, Prioritized Themes and R&D supervisors may also be evaluated. This evaluation is performed from the viewpoint of determining progress made towards achieving each theme and administrative performance. Selected Principal Investigators are requested to cooperate in the evaluation as appropriate.

2.1.2 Proposal selection for Small-start type research

(1) R&D proposals sought

1) R&D proposals concerning the seven Prioritized Themes described in "2.1.1 (1) Target areas and Prioritized Themes for call" are requested.
2) Carefully read the R&D supervisor's policies for proposal selection for each Prioritized Theme described in Appendix Application Guideline, Chapter 6 "Prioritized Theme and Technology Theme for Research Proposals (https://www.jst.go.jp/mirai/jp/uploads/application-guideline-r01-c6.pdf)" as this will allow you to make a R&D proposal that is suitable for the Prioritized Theme.

3) Be sure to see the description of important common provisions contained in "2.3 Common matters concerning proposal selection for projects."

(2) Period for submitting proposals

Wed., May 15, 2019 – Wed., July 24, 2019 at 12:00 noon (No delays accepted)

Please see main schedule on the opening page for details of the schedules for briefings and selection.

Proposals for which, for any reason, the registration procedure is not completed on e-Rad by the deadline will not be accepted for examination.

(3) Number of project proposals for adoption

The number of proposals to be adopted for each Prioritized Theme is 2–9.
(This can vary depending on the objective of each Prioritized Theme, status of proposal applications, and budget.)

(4) Special treatment upon adoption

1) Concerning possible coordination of areas and Prioritized Themes

For each Prioritized Theme included in the selection process, a project supervisor or an R&D supervisor may conduct interdisciplinary coordination of the related R&D proposals. Consequently, a proposal made under a particular Prioritized Theme may be transferred to another Prioritized Theme. In such a case, a notice is sent to the proposer once this decision has been made.

2) Concerning surveys on specific projects

A "specific project survey" may only be conducted on themes in order to attract proposals during this and the next submission window. Concerning the R&D proposals, for which small budgets are required, research data can be supplemented over short periods, and accurate evaluations may be expected when applied on and after the next recruitment, the R&D supervisor may request the R&D proposer to perform a specific project survey separately from the adopted project.

A prerequisite for a specific project survey is, in principle, a re-application made under the pertinent Prioritized Theme and by the deadline specified by the R&D supervisor. In such a case, the application is handled in the same way as other R&D projects; no priority is given. Further, no direct application is allowed for the specific project survey.

(5) Requirements for application

Requirements for application are the following 1) – 3):

Be aware of the following, which relates to application requirements.

- R&D proposals that do not meet application requirements are, in principle, neither accepted nor adopted.
- Application requirements must be maintained throughout the entirety of the research project's duration, if adopted. In principle, if the requirements cease to be maintained

during the R&D period, the entire, or part of the, research project is cancelled (finished early).

In addition to 1) – 3) below, an application should only be made once you have gained an appropriate understanding of the contents of "2.3.2 Concerning restrictions on duplicate applications for the JST-Mirai program."

1) Requirements for proposers

a. A research proposer, upon becoming a Principal Investigator, forms a research team from members of a domestic research organization (such as a private firm, an incorporated association, or an incorporated foundation) she/he is affiliated with in Japan (the proposer may be of any nationality).

* The following individuals may also apply to be research proposers:
  - A researcher who is a foreigner and affiliated with a Japanese research organization.
  - A researcher who is not affiliated with any specific research organization or with an overseas research organization but who can work with a Japanese research organization to form a R&D team if adopted as a Principal Investigator (any nationality is acceptable).

b. A researcher who can undertake reponsibilities for an entire R&D project, functioning as a representative of a R&D team throughout a R&D period.
(see "3.4 Responsibilities of Principal Investigator, Lead Joint Researchers" for details.)

c. A researcher who has completed a research ethics education program at the research organization she/he is affiliated with. (see "4.1 Enrolling in and Completing the Educational Program for Research Integrity" for details.)

d. A researcher who can pledge to observe the following four points:
  - That they understand and comply with "Guidelines for responding to inappropriate behavior during research activity" (a decision made by Minister of Education, Culture, Sports, Science and Technology, August 26, 2016)
  - That they understand and comply with "Guidelines for managing and auditing public research funds in research organizations (practice criteria) (revised on February 18, 2016)"
  - That they, as Principal Investigator and R&D participants, will refrain from participating in inappropriate conduct (fabrication, fraudulent alteration, fraudulent use) in regard to research activities, or inappropriate use of R&D budgets if their R&D proposal is adopted.
  - That they have no record of previous inappropriate research activity; this should be included in the proposal for full-scale research.
  (confirmation of this is required on the information input screen on e-Rad.)

2) Requirements for research teams

The following requirements must be met.

a. A research team is an optimum system for realizing the idea of the R&D proposer, who will gain the position of Principal Investigator once the proposal is accepted.

b. A joint research group within a research team is necessary and essential for the realization of research ideas and can substantially contribute to achieving research goals.

c. If an overseas research organization participates as a joint research group (such as in a case where a researcher affiliated with an overseas research organization participates as a main joint researcher), it can be difficult to conduct research on realizing the research idea without input from the overseas organization (receiving such input requires approval from the R&D supervisor). In such a case, it should be possible to obtain results, such as intellectual property rights.

* When including an overseas research organization in a research team, describe in the R&D plan (form 3) for the R&D proposal the reason a researcher affiliated with an overseas research organization is required. Further, the overseas research organization must sign a contract agreeing to the proposed content stipulated by JST (maximum indirect costs is 30% of direct costs). Before the interview for proposal selection, submit the specified form (to be outlined later) that shows prior approval from a person in charge of contracts for the overseas research organization.

3) Requirements for research organizations

Research organizations must fully recognize that the original funding for R&D agreements is sourced from public funds, and they should make efforts to conduct their research efficiently, as well as to comply with associated laws. Any research organization that cannot perform the reponsibilities described in "3.5 Responsibilities of R&D Institutions" will not be approved to conduct research. Therefore, be sure to obtain prior approval from the R&D institute at which you plan to conduct your R&D before submitting an application.

(6) Selection viewpoints

1) Selection Standards (Preliminary Evaluation Standards)

Common selection standards for the JST-Mirai program (Small-start type and Large-scale type) are described below. All proposal contents described in 1.-5. must be met for selection of the Small-start type (full-scale research) and the Large-scale type.

Common to the Small-start type (full-scale research) and the Large-scale type
1. Does the objective aim for the proof of concept (POC)? Is the objective (and milestone) set to allow the POC to be clearly defined in a form that makes objective judgment possible? Also, does the objective meet the purposes of a Prioritized Theme and a Technology Theme?
2. Whether highly impactful Are the needs to achieve the proof of concept (POC), or so far non-existing social and economic impacts, and social and industrial needs for it verified on the basis of evidence?
3. Are challenges and risks understood? Is a bottleneck (technological issues and difficulty, issues and difficulties for social implementation) in achieving the proof of concept (POC) clearly recognized? And are risks

in achieving it understood accurately?
4. Are the R&D plan and R&D ideas appropriate? Is a method for the bottleneck described in 3, or an R&D plan* appropriate? In addition, is a vision (business model and the like) for activities after research completion included in the plan? * A specific plan of participation of industries for "Large-scale type" * The quality of the Principal Investigator (PL/PM) is judged as part of R&D ideas and to supplement selection criteria for the Small-start type and the Large-scale type.
5. Are the quality and achievements of the Principal Investigator appropriate? Check "(2) Supplement for selection standard" on the next page for this item.

2) Supplement for selection standards

In addition to the above "1) Selection standards (Preliminary Evaluation Standards)," selection standards for the Small-start types (Feasibility study/Component-technology type) are given below.

- **<Supplement to selection standards for the Small-start type>**

Feasibility studies of the Small-start type are selected using the following items based on selection standards.
Full-scale research projects are selected on the basis of evaluation after a feasibility study.

1. Is the goal clear and aiming for a proof of concept (POC)? • The proof of concept (POC) is defined as clearly as possible and is focused on the core of a Prioritized Theme. • Socially, industrially, and technologically challenging goals are explained as specifically as possible in a form that allows the proof of concept (POC) to be judged for validity and focused on the core of a Prioritized Theme.
2. Whether or not impactful? • Achievement of the proposed proof of concept (POC) exerts great social and economic impacts (if realized, it reforms the future of society and industries in Japan) and the social and industrial needs for it are verified with concrete evidence, or the verification process is examined.
3. Are challenges and risks understood? • Is a bottleneck (technological difficulties, issues in social implementation) in achieving a proposed proof of concept (POC) explained clearly or is the verification process examined? • A set goal is adequate for clearing the bottleneck (technological issues and difficulties) and highly challenging research trends in Japan and overseas ("results of R&D are expected to be considered "marvelous" by society, business firms, and investors). • Risks in achieving the proposed proof of concept (POC) are accurately recognized, the likelihood of the achievement is indicated reasonably well, or the verification process is

examined.

4. Are the R&D plan and ideas appropriate?

- An R&D plan (execution system, budget, setting stage gates) for achieving a proposed proof of concept (POC) has been considered.
  * The goal for the feasibility study and a plan for achieving it are at least concrete and appropriate in the above plan.
- Plans, techniques, and milestones have original contents.
- An action plan that examines the development (a business model including costs accruing after the POC and time, passing results over to business firms) of research results.

Component technologies of the Small-start type are selected using the following items based on the selection standards.

1. Is the goal clear and aiming for a proof of concept (POC)?

- The proposed R & D goals are in sharp focus on core of the Prioritized Theme and contributing to the realization.
- R&D goals are explained as specifically as possible in a form that allows to be judged for validity.

2. Whether or not impactful?

- It is clearly stated that the impact on the Prioritized Theme is extremely large by achieving of this proposed R&D goals.

3. Are challenges and risks understood?

- Is a bottleneck (technological difficulties, issues in social implementation) in achieving a proposed proof of concept (POC) explained clearly?
- Creative and Challenging

4. Are the R&D plan and ideas appropriate?

- R & D plan to achieve goal is conceived
- Plans, techniques, and milestones have original contents.

The Principal Investigator for the Small-start type research plays a role in promoting R&D under the R&D supervisor. The Principal Investigator is expected to integrate collaboration with her/his aides and pass the position and support from an affiliated organization to another person in order to manage whole R&D project.

Considering the role and responsibilities of the Principal Investigator in Small-start type research, it has been decided that the quality and achievements of the Principal Investigator are evaluated using “5. Are the quality and achievements of the Project Manager appropriate?” in “2.2.2 Proposal selection for Small-start type research, (5) Selection viewpoints” <Supplement to selection standards for the Large-scale type> defined for the Large-scale type as a reference.

Measures and system preparation are required for supporting R&D at the R&D institutions

for the examination of transfer to full-scale research. The preparation and examination are used as references for selecting feasibility studies.

2.1.3 R&D proposal (Form) & Completion Requirements

The format of R&D proposal differs in Feasibility Study (2.1.4 “Feasibility Study” R&D proposal (Form) Completion Requirements) and Feasibility Study (Component-technology type) (2.1.5 “Feasibility Study (Component-technology type)” R&D proposal (Form) Completion Requirements).

Download and use the proposal forms for “Small-start type” provided on JST Website (https://www.jst.go.jp/mirai/jp/open-call/research/r01/).

Be sure to comply with Appendix Application Guideline, Chapter 6 "Prioritized Theme and Technology Theme for Research Proposals

(https://www.jst.go.jp/mirai/jp/uploads/application-guideline-r01-c6.pdf)” when preparing proposal forms.

Conditions (R&D period, R&D costs and the like) for applications may vary by Prioritized Theme.

“Feasibility Study Small-start type research (Component-technology type)” for this year is applicable to following area;

■“Common Platform Technology, Facilities, and Equipment” area

Please choose applicable target for your Component-technology from Sub-Prioritized Themes ST01-09 (except ST10) under Prioritized Theme：Realization of Common Platform Technology, Facilities, and Equipment that creates Innovative Knowledge and Products

Please refer to 2.1.5 “Feasibility Study (Component-technology type)” R&D proposal (Form) Completion Requirements for more details.

Please refer to 2.1.4 “Feasibility Study” R&D proposal (Form) Completion Requirements

In cooperation with the coordinator, when considering the problem, please state the opinion of the coordinator as far as possible. Submitting a proposal (form 9) is optional and not mandatory. (except Feasibility Study (Component-technology type))

2.1.4 “Feasibility Study” R&D proposal (Form) Completion Requirements

Be sure to use the forms stipulated for this fiscal year. Please download from the following project Website. To appropriately prepare an R&D proposal, follow the guidelines (refer to blue letters in proposal) concerning completing such forms.

https://www.jst.go.jp/mirai/jp/open-call/research/r01/

* Be sure to use the forms for Prioritized Theme (Small-start type).

A list of the forms to be submitted is shown below.

Form No.	Document
Form 1	R&D proposal, cover
Form 2	R&D Project Description
Form 3	R&D plan of Feasibility Study
Form 4	R&D Budget
Form 5	R&D Project Applicant (Project Leader)
Form 6	Other Funding Supports
Form 7	Measures for Protecting Civil Rights and Complying with Laws and Regulations
Form 8	References
Form 9 (optional)	View of the person promotes cooperation of academia and industry like coordinator or the person in charge of the company

* Ensure the file does not exceed 3MB.
* Be sure to check (2) Managing the conflicts of interest (persons engaged in selection) in “2.3.3 Selection method” when preparing proposal forms.
* See “Chapter 5, Submission via the Cross-ministerial R&D Management System (e-Rad)” for application methods for R&D proposals.
* Be sure you have an appropriate understanding of “Chapter 4, Key Points in Submitting Proposals” and “Chapter 2, 2.3.2 Concerning restrictions on duplicate applications for the JST-Mirai program” before making an application.

2.1.5 “Feasibility Study (Component-technology type)” R&D proposal (Form) Completion Requirements

Be sure to use the forms stipulated for this fiscal year. Please download from the following project Website. To appropriately prepare an R&D proposal, follow the guidelines (refer to blue letters in proposal) concerning completing such forms.

https://www.jst.go.jp/mirai/jp/open-call/research/r01/

* Be sure to use the forms for Prioritized Theme (Component-technology type).

A list of the forms to be submitted is shown below.

Form No.	Document
Form 1	R&D proposal, cover
Form 2	R&D Project Description
Form 3	R&D Project Applicant (Project Leader)
Form 4	Other Funding Supports
Form 5	Measures for Protecting Civil Rights and Complying with Laws and Regulations
Following documents only for interview applicants	
Form 6	Team to conduct on R&D
Form 7	R&D Budget
Form 8	References

* Ensure the file does not exceed 3MB.
* Be sure to check (2) Managing the conflicts of interest (persons engaged in selection) in “2.3.3 Selection method” when preparing proposal forms.
* See “Chapter 5 Submission via the Cross-ministerial R&D Management System (e-Rad)” for application methods for R&D proposals.
* Be sure you have an appropriate understanding of “Chapter 4 Key Points in Submitting Proposals” and “Chapter 2, 2.3.2 Concerning restrictions on duplicate applications for the JST-Mirai program” before making an application.

2.2 Large-scale type

2.2.1 Concerning the Large-scale type

(1) Technology Theme for public invitation

R&D Type	R&D Areas for which Proposals will be Solicited
Large-scale type	(R&D Supervisor (PO): Yoshihiro OISHI) Innovative Thermoelectric conversion technologies for stand-alone power supply of sensors (New)

(2) Outline of the Large-scale type

An outline of JST-Mirai program (Large-scale type) is included below.

For additional information, see "2.3 Common matters concerning proposal selection for projects."

1) JST-Mirai program collects and analyzes information concerning science and technology innovations, introduces changes to current technology systems, and makes concentrated investments in technology R&D, in order to develop future base technologies specified by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). These are used to carry out research for technological demonstrations.

2) An R&D supervisor oversees several areas of technology and manages entire large-scale research initiatives. To accomplish this, s/he collaborates with experts in particular technological fields, using the following means to fully explore each Technology Theme, and to monitor the progress of the PM (Project Manager) and R&D projects:
   - Select R&D projects;
   - Advice, coordination, and approval of research plans (including R&D costs and team plans);
   - Evaluations of the work of PMs or research representatives, including how well they challenge, motivate, and give guidance to staff;
   - Surveys carried out during site visits;
   - Evaluations of the PM's activities, achieved goals, and advice;
   - Recommendations to the R&D supervisors conference that a PM be terminated or an R&D project revoked;
   - various other means.

3) The Project Manager (PM) develops the Proof of Concept (POC) based on excellent, original R&D ideas that s/he has established. S/he then prepares milestones and an R&D plan (including R&D costs and team plans). The PM is responsible for entire R&D projects and for the whole R&D team which s/he directs, manages, and guides in its progress, ensuring that the R&D reaches its goal.
   The PM can flexibly form an optimum R&D teams composed of a number of researchers and organizations (for example, by issuing a public call for researchers) once the R&D plan has been approved by an R&D supervisor. The PM will promote the R&D project while receiving stage gate evaluation (to determine whether the R&D project should be continued or revoked) based on milestones set at the launch of the R&D project.

4) To ensure swift social implementation of a newly created fundamental technology, while encouraging investment from the private sector, Large-scale type encourage early participation by private firms and require a commitment to contribute funds from an “organization asked to provide funds” (a “sponsoring organization”). See “2.2.1 (3) 8) (c) Definition of a “certain amount of funding.” If sufficient funding is not provided by a sponsoring organization, action may be taken to terminate the R&D project early (revocation). For additional information about stage gate evaluation, see “2.2.1 (3) 8) Stage gate evaluation."

(3) Mechanism Large-scale type

1) The execution of R&D projects managed by the PM

- ○ A PM promotes R&D in light of the selection results by the R&D management convention on PM and R&D projects and by the R&D supervisors’ convention.
- ○ JST signs a contract with an R&D institute on the basis of the PM’s R&D plan, which has been approved by an R&D supervisor. The R&D institute carries out R&D in accordance with the R&D agreement. The PM is responsible for the execution and management of the R&D.

2) PM progress reports

- ○ The PM shall give an R&D progress report to the R&D supervisor approximately once every six months. To assist the PM in effectively assessing progress, The R&D supervisor and R&D management committee members will ask PM to make progress reports and site visits as necessary.
- ○ The R&D supervisor and R&D management committee members will take into account the content of the progress reports when asking the PM for necessary improvements. When requested to make improvements, the PM is encouraged to adopt high-risk high-impact approaches, as the system is set up to provide him/her with the necessary freedom and authority.
- ○ The R&D management convention shall be allowed to ask JST to terminate a PM on the following grounds: on the basis of an evaluation or examination by the R&D supervisor; if improvements requested by the R&D supervisor and R&D management committee members are not made; and when it seems unlikely that the project will achieve its stated goal.
- ○ The PM is allowed to ask for advice from the R&D supervisor and from R&D management committee members. When asked for advice by the PM, the R&D supervisor must provide proper advice, as required.

3) R&D costs

The budget of a project is 1 billion yen for the period of one to four fiscal years (a total of 3.1 billion yen for 10 years; approximately 250 million yen for the period of one to four fiscal years, for direct costs only; indirect costs are treated differently.). When multiple proposals are accepted based on the Technology Themes of this year, the costs for relevant themes will be adjusted within the budget.

For projects accepted during the 2019 fiscal year, a first stage gate evaluation will be made by the end of the 2022 fiscal year, at the latest. The R&D supervisor will determine the timing of the stage gate evaluation.

If the research project is continued as a result of evaluation results, the budget is a total of 2.1 billion yen (direct costs only; indirect costs are treated differently; approximately 350 million yen for the period of five to 10 fiscal years).

For more information, see Appendix Application Guideline, Chapter 6 "Prioritized Theme and Technology Theme for Research Proposals (https://www.jst.go.jp/mirai/jp/uploads/application-guideline-r01-c6.pdf)."

Based on the R&D agreement, the JST makes a payment to cover R&D costs and indirect costs (up to a maximum of 30% of direct costs) to an R&D institute; these are contract R&D costs.

4) R&D costs: assessment and variability

The proposed budget and R&D costs are subject to assessment during the selection period; they can be changed to reflect constraints on the total budget. Actual R&D costs are determined through the strict examination and approval of an R&D plan, stage gate reviews, and a clear understanding of progress.

The R&D budget is set each year, taking into account R&D progress and the total budget for all projects underway that year.

5) R&D period

An R&D period is about nine-and-a-half years maximum, from November 2019 to March 2029 (or until the end of the fiscal year following the 10th fiscal year), as long as the R&D initiative in question continues after the stage gate reviews. If the stage gate reviews and progress indicators result in an R&D termination, the PM is expected to consult with the R&D supervisor to summarize R&D achievements for the year.

The actual R&D period is determined through strict examination and approval of an R&D plan, stage gate reviews and the like.

6) R&D team

The PM is asked to form an optimum R&D team, composed of a number of organizations and researchers and drawn together by her/his own excellent, original R&D ideas. The team must be assembled using appropriate methods, including nominating and calling for experts. Japanese research organizations and researchers must be selected for their ability to contribute high-level knowledge and R&D capabilities.

a. The PM may set up a research group ("joint research group") composed of researchers affiliated with laboratories or research organizations in order to follow through on R&D ideas.
b. Of the members of an R&D team, the representative of a "joint research group" is referred to as the "main joint researcher."
c. Researchers and research assistants for an R&D project may be employed using R&D costs

(within the research organization's R&D agreement) if needed to advance the research.

* See "2.2.2 Proposal selection for large-scale research (4) Requirements for application" for a list of research team requirements.

d. PM can set up a research-focused "R&D representatives' group" composed of researchers that s/he directs.

7) R&D support system

As part of the R&D system, the PM is asked to establish a support system and measures to ensure that R&D will be carried out effectively and efficiently by researchers so that they can concentrate on R&D tasks.

To achieve this goal, the PM is asked to identify a system and relevant measures to support and promote R&D, in cooperation with the main joint researchers and R&D institutes. The R&D institutes, in particular, are expected to fully exploit their various functions and mechanisms to support the R&D project, as well as providing any assistance needed by the PM.

The PM is asked to summarize the supporting measures that research organizations have committed themselves to providing, and to include this summary in an R&D proposal.

8) Stage gate evaluation

Stage gate evaluation may lead to (i) changes in team composition, (ii) increases or decreases in R&D costs, and (iii) termination of an R&D project.

For projects accepted during the 2019 fiscal year, a first stage gate evaluation will be made by the end of the 2022 fiscal year, at the latest. The R&D supervisor will determine the timing of the stage gate evaluation, on the basis of an R&D plan.

To ensure that newly created fundamental technologies are brought swiftly to the stage of social implementation, and also to attract private investment, a certain amount of funding for planned R&D from a "sponsoring organization" (as defined below) is required at the first stage gate evaluation after the launch of an R&D project. If no sponsorship funding is secured, a comprehensive evaluation may lead to the early termination or adjustment of the R&D project.

① The types of organization that can be asked to provide funding (sponsoring organizations) include the following:
private firms, such as corporations, holding companies, limited corporations, general incorporated associations, general incorporated foundations, public interest incorporated associations, or public interest incorporated foundations.

② Corporate sponsorship can be used to cover the following expenses:

(a) A corporate sponsor can support an R&D institute that has signed an R&D agreement with JST by funding or offsetting joint R&D costs (including indirect costs) within a selected project. Appropriate forms of support include donations, gifts-in-kind (including the use of facilities, equipment, and supplies), personnel costs, gratuities, and travel expenses.

(b) R&D costs can be directly funded by a sponsoring organization to promote R&D in selected projects. These expenses include the cost of supplies and equipment,

personnel costs, gratuities, and travel expenses. They also include the salaries of researchers seconded by the corporate sponsor to an R&D institute that has signed an R&D agreement with JST.

(c) Expenses paid directly by the sponsoring organization to secure the right to make use of R&D results produced by the selected projects

③ Definition of a "certain amount of funding"
20% or more of total R&D costs (as set out in JST R&D agreement) per year must be funded by a sponsoring organization.

$$\frac{\text{Funding received from a sponsoring organization}}{\text{Expenses associated with the R\&D agreement are covered by JST + by funding provided by the sponsoring organization}} = 20\% \text{ or more}$$

(4) Flow of R&D management in Large-scale type

1) Proposal selection for R&D proposals

JST calls for R&D proposals in every area of technology specified by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). The R&D supervisor collaborates with members of the R&D management committee to select proposals in each Technology Theme. For 2019 fiscal year, JST calls for one Technology Theme.

2) The preparation of an R&D plan

When a proposal has been selected, the PM prepares a comprehensive R&D plan to cover the whole R&D period. In addition, the PM prepares an annual R&D plan for each fiscal year. An R&D plan includes project goals, such as POC and milestones, R&D costs, intellectual property creation plans, and the composition of an R&D team.

3) Agreement

When an R&D plan has been chosen, JST signs an R&D agreement in principle with a research organization that the PM and main joint researcher are affiliated with.
The PM selects R&D institutes by using appropriate methods, including nomination and publicly calling for participants. In principle, chosen organizations may take part in R&D projects once they have signed an R&D agreement with the JST.

4) Conducting R&D

An R&D period can last a maximum of about nine and a half years—from November 2019 to March 2029 (it is possible to extend this period to the end of the 10th fiscal year). This timeframe includes stage gate reviews and R&D continuation (stage up). If stage gate review and progress management results lead to the R&D project being terminated, the PM is expected to consult with the R&D supervisor and to summarize the R&D results for that year.

5) Evaluation

The R&D supervisor monitors the progress and results of the R&D and collaborates with

members of the R&D management committee to evaluate the project at each stage gate review, and to ensure the completion of the project.

<Evaluating R&D projects and PMs>

a. An R&D supervisor monitors the progress and results of the R&D and collaborates with members of the R&D management committee to submit evaluations at stage gate reviews and to ensure the completion of R&D projects. A stage gate review is carried out approximately three years after the launch of the research project, to determine whether or not it should continue. An interim evaluation is carried out approximately every three years after the stage gate review. A final assessment is made during the last year of an R&D period.
b. In addition to the above, an R&D project evaluation may be carried out whenever the R&D supervisor judges that it is necessary.
c. The results of project evaluations, including the interim review, are taken into consideration during subsequent adjustments to an R&D plan. They also contribute to resource distribution (an increase or decrease in R&D costs, or a change in the composition of the research group). Some evaluation results may lead to early completion (termination) of an R&D project or to the adjustment of an R&D period.
d. Both the activities of the PM her/himself and the R&D project are evaluated. JST also evaluates project personnel each year.
e. At a set time after an R&D project has been completed, a follow-up survey is carried out to analyze the development and use of R&D results and the activities of research participants. Outside experts appointed by JST will provide a follow-up evaluation, based on the results of the follow-up survey.

In addition to the R&D project evaluation, the R&D supervisor's effectiveness in achieving a goal may be assessed, from a management viewpoint. The appointed PMs are asked to cooperate with these evaluations, as necessary.

6) Situations where it is difficult to continue an R&D project

When one of the situations described below arises, JST determines whether an R&D project should be continued on the basis of analyses carried out by the R&D supervisor and management committee.

a. If a PM should pass away, or PM should receive an order of commencement of guardianship
b. If the PM misused R&D funds or other forms of inappropriate conduct related to the R&D activity
c. When other reasons to make it difficult to continue the R&D

2.2.2 Proposal selection for large-scale research

(1) R&D proposals sought

1) R&D proposals are called for in one Technology Theme, as described in "2.2.1 (1) Technology Theme for public invitation
2) Further information about the technological area is described in Appendix Application Guideline, Chapter 6 "Prioritized Theme and Technology Theme for Research Proposals (https://www.jst.go.jp/mirai/jp/uploads/application-guideline-r01-c6.pdf)." This chapter also explains the R&D supervisor's policies for proposal selection and management, ensuring that they fit within the three specified technological areas.
3) Be sure to check important common matters described in "2.3 Common matters concerning proposal selection for projects."

(2) Period for submitting proposals

Wed., May 15, 2019 – Wed., July 24, 2019 at 12:00 noon (No delays accepted)

See the main schedule for briefing and selection on the opening page.
Only if an application procedure has been completed through e-Rad by the deadline will a proposal be subject to examination.

(3) Number of project proposals for adoption

We plan to accept one project in Technology Theme in 2019 fiscal year.

(4) Requirements for application

Requirements for application are described below in points 1)-3).
Please be aware of the following requirements:

* An R&D proposal that does not meet all requirements by the selection deadline will, on principle, be neither selected nor accepted.
* Application requirements must be adhered to throughout the entire R&D period, once a proposal has been accepted. If any requirements are neglected during this period, the whole or part of the R&D project will be terminated. Before applying, ensure that you have read and understood "Chapter 4 Key Points in Submitting Proposals" in addition to the following points, 1)-3).

1) Requirements for submitting a proposal

The applicants shall meet all of the following requirements.

① An application shall be made by one person; it may not be a joint proposal.

② PM shall engage in PM work at the highest possible effort.

③ An applicant who becomes the PM is affiliated with a research organization in Japan to form a research team there (there are no restrictions on the applicant's nationality).

* The persons mentioned below may also propose research projects:

・ Researchers of foreign nationality who are affiliated with research organizations in Japan;

・ Researchers who are not affiliated with any Japanese organization or affiliated with overseas research organization, but who can be affiliated with a research organization in Japan to form a research team if accepted as an R&D representative (there are no restrictions on the applicant's nationality).

* People affiliated with private firms, including research organizations other than universities, are also acceptable.

④ The applicant can manage all aspects of the R&D project in question, as the person in charge of an R&D team.

* See "3.4 Responsibilities of Principal Investigator, Lead Joint Researchers" for additional details.

⑤ The applicant has completed a research ethics education program at the R&D institute that he/she is affiliated with. Alternatively, the applicant may have completed an education program provided by JST.

* See "4.1 Regarding attendance at and completion of a program of research ethics education" for details.

⑥ The applicant pledges to observe the following four points

- The applicant understands and agrees to comply with the "Guidelines for responding to fraudulent behavior at research organizations (Decided by the Minister of Education, Culture, Sports, Science and Technology, August 26, 2014)."
- The applicant understands and agrees to comply with the "Guidelines for the management and audit of public research expenses at research organizations (practical criteria), revised on February 18, 2014."
- The PM and R&D participants are forbidden to engage in fraudulent behavior (fabrication, fraudulent modification and use) or to declare fraudulent R&D budgets.
- The applicant has not been involved in fraudulent research activities involving research achievements described in the R&D proposal.

* The applicant is requested to confirm his/her acceptance of these terms by using the e-Rad screen for inputting application information.

2) Requirements for research teams

A research team needs to meet the following requirements. Also see "2.2.2 Proposal selection for large-scale research (5) Selection viewpoints."

a. A research team is an optimum system for realizing the R&D ideas of the author of an R&D proposal, acting as the research representative.
b. A joint research group, placed in an R&D team, is indispensable for realizing R&D ideas and can greatly contribute to achieving research objectives.
c. Research that an overseas research organization is collaborating as part of a joint research group (researchers affiliated with the overseas research organization are participating in

the research as lead researcher), must be the one that it is difficult to achieve goal of R&D ideas without participation of the said foreign organization (the approval of the R&D supervisor is necessary). When working with an overseas body, it should be possible to fully grasp intellectual property rights arising from the research.

* Those who wish to form an R&D team that includes an overseas research organization must describe the composition of the overseas team in the joint research group column of a large-scale R&D proposal (R&D system-form 5). They must also explain, under "special matters" why the joint researchers affiliated with the overseas research organization are needed.

  The overseas research organization must, on principle, accept JST's R&D funding guidelines (maximum indirect costs of 30%) when signing an R&D agreement with JST. Please submit a form (to be finalized later) to show prior approval by a responsible person in the contract department of the overseas research organization before the selection interview. An overseas research organization is not allowed to participate in an R&D team unless an R&D agreement can be signed.

3) Requirements for R&D institutes

An R&D institute must fully recognize that R&D funding is public money; it must therefore comply with the laws that require R&D to be carried out efficiently.

A project at an R&D institute that cannot fulfil the requirements and reponsibilities described in "3.5 Responsibilities of R&D Institutions" will not be approved. Be sure to obtain prior approval from the organization at which the R&D will be carried out before making an application.

(5) Selection viewpoints

1) Selection Standards (Preliminary Evaluation Standards)

Common selection standards for the JST-Mirai program (Small-start type and Large-scale type) are described below. All proposal contents described in 1.-5. must be met for selection of the Small-start type (full-scale research) and the Large-scale type. (reposted on page 22)

Common to Small-start type (full-scale research) and Large-scale type
1. Does the objective aim for the proof of concept (POC)? Is the objective (and milestone) set to allow the POC to be clearly defined in a form that makes objective judgment possible? Also, does the objective meet the purposes of a Prioritized Theme and a Technology Theme?
2. Whether highly impactful Are the needs to achieve the proof of concept (POC), or so far non-existing social and economic impacts, and social and industrial needs for it verified on the basis of evidence?

3. Are challenges and risks understood? Is a bottleneck (technological issues and difficulty, issues and difficulties for social implementation) in achieving the proof of concept (POC) clearly recognized? And are the risks in achieving it understood accurately?
4. Are the R&D plan and R&D ideas appropriate? Is a method for the bottleneck described in 3, or an R&D plan* appropriate? In addition, is a vision (business model and the like) for activities after research completion included in the plan? * A specific plan of participation of industries for "Large-scale type" * The quality of the Principal Investigator (PL/PM) is judged as part of R&D ideas and to supplement selection criteria for the Small-start type and the Large-scale type.
5. Are the quality and achievements of the Principal Investigator appropriate? Check "(2) Supplement for selection standard" below.

2) Supplement for selection standards

In addition to the above "(1) Selection standards (Preliminary Evaluation Standards)," selection standards for the Large-scale type are given below.

<Supplement to selection criteria for the Large-scale type>

Large-scale type studies are selected using the following items based on the selection criteria.

1. Is the goal clear and aiming for a proof of concept (POC)?

- The goal (and milestones) aiming for the proof of concept are clearly set.
- The R&D plan concretely proves and shows a proof of concept (POC) to others including private firms, so that feasibility may be judged when the goal is reached.

2. Whether or not impactful?

- A reasonable vision for development after a proof of concept (POC) and a reasonable outcome that reforms the future of society and industries in Japan are depicted.
- A goal and a depicted outcome, if realized, bring great innovations (of high impact) to the society and industries in Japan in the future.
  *It is desirable to indicate evidence-based concrete impacts if possible.

3. Are challenges and risks understood?

- The set goal is highly challenging enough to clear a bottleneck (technological issues and difficulty) (are R&D results expected to be considered “marvelous” by business firms and investors?).
- Risks in reaching the goal are accurately recognized.
- The likelihood of reaching the goal is indicated in a reasonable manner, taking risks into account.

4. Are the R&D plan and ideas appropriate?

- The R&D plan aims to reach a goal and is appropriate (including an R&D team and setting stage gates).
- It can acquire top-level R&D capabilities and knowledge. In addition, it can be expected to yield excellent achievements to be publicized (papers and the like).
- On the basis of a reasonable vision for development after the proof of concept (POC), approaches are planned that lead to exits such as collaboration with private firms, venture businesses, passing R&D to other projects, and yielding human resources that can pass R&D over.
- Participation by industries is planned in a concrete manner.

5. Are the quality and achievements of the Project Manager appropriate?

- Outstanding ideas, knowledge, planning ability, and management ability
- Expert knowledge and understanding of Technology Themes, ability to grasp news and R&D trends in Japan and overseas
- Ability to overlook a wide range of technologies and market trends, ability to commercialize and develop ideas from various viewpoints
- Ability to communicate not only with researchers but with all associated people, leadership for reaching a goal
- Network with experts in industries, academia, and the government and ability to collect technological information
- Willingness to achieve highly impactful innovations
- Ability to present comprehensible explanations about her/his own R&D ideas to outsiders

<supplement>

1. See Appendix Application Guideline, Chapter 6 "Prioritized Theme and Technology Theme for Research Proposals (https://www.jst.go.jp/mirai/jp/uploads/application-guideline-r01-c6.pdf)" for item 1. "Purposes of Prioritized Themes and Technology Themes" of "2.2.5 (5) 1) Selection Standards (Preliminary Evaluation Standards)" Unique selection viewpoints and policies as well as management policies are also described by Prioritized Theme and by Technology Theme.
2. "Unreasonable duplications" or "excessive concentration" of R&D costs is also a selection criterion. See "4.2 Measures for unreasonable duplications and excessive concentration" for details.
3. JST may ask for the submission of information materials besides the proposal documents to manage the conflicts of interests among researchers. (An example is a case in which a PM allows an organization to participate in a joint research group with the PM in a conflict of interest.)

2.2.3 R&D proposal (Form) Completion Requirements

Be sure to use the forms stipulated for this fiscal year. Download and use the proposal forms for "Large-scale type" from the following project Website. To appropriately prepare an R&D proposal, follow the guidelines (refer to blue letters in proposal) to complete such forms.

https://www.jst.go.jp/mirai/jp/open-call/research/r01/

Be sure to comply with Appendix Application Guideline, Chapter 6 "Prioritized Theme and Technology Theme for Research Proposals (https://www.jst.go.jp/mirai/jp/uploads/application-guideline-r01-c6.pdf)" when preparing proposal forms.

A list of the forms to be submitted is shown below.

Form No.	Document
Form 1	R&D proposal, cover
Form 2	R&D proposal, Project Applicant (Project Leader)
Form 3	R&D proposal, Project Description
Form 4	R&D proposal, plan of Feasibility Study
Form 5	Team to conduct on R&D
Form 6	R&D Budget
Form 7	List of achievements, results of evaluation at completion, list of patents
Form 8	Other Funding Supports
Form 9	Measures for Protecting Civil Rights and Complying with Laws and Regulations
Form 10	References

* Ensure the file does not exceed 3MB.
* Be sure to check (2) Managing the conflicts of interest (persons engaged in selection) in “2.3.3 Selection method” when preparing proposal forms.
* See “Chapter 5, Submission via the Cross-ministerial R&D Management System (e-Rad)” for application methods for R&D proposals.
* Be sure you have an appropriate understanding of “Chapter 4, Key Points in Submitting Proposals” and “Chapter 2, 2.3.2 Concerning restrictions on duplicate applications for the JST-Mirai program” before making an application.

2.3 Common matters concerning proposal selection for projects

2.3.1 Solicitation and Selection Schedule

R&D proposal acceptance begins	Wed., May 15, 2019
Briefings of Solicitation	Check the page on call for proposals at the Department of R&D for Future Creation's website for updated information. https://www.jst.go.jp/mirai/jp/open-call/research/r01/
Application deadline (Deadline for submitting applications through the e-Rad system)	Wed., July 24, 2019 at 12:00 noon (Japan time) *No delays accepted

Application of proposal is implemented via e-Rad system (see Chapter 5, Submission via the Cross-ministerial R&D Management System (e-Rad)).

As the application deadline approaches, heavy demands on the e-Rad system could slow down the application process and even cause the application deadline to be missed. Please give yourself enough time to complete submission of the proposal.

Proposals for which the application procedure has not been completed via e-Rad by the deadline is subject to examination for whatever reasons.

Document screening period	Early-August to Middle-September
Interview screening period	Late-August to Early October
Notification/announcement of selected proposals	Early-November
R&D project begins	After Early-November

* The dates are the expected ones. They are subject to change.
* Specific interview selection schedule will be determined by JST.
* As soon as it is determined, the document screening and the interview selection schedule will be announced on the public invitation page in the website shown below: (https://www.jst.go.jp/mirai/jp/open-call/research/r01/)

2.3.2 Concerning restrictions on duplicate applications for the JST-Mirai program

The following restrictions are imposed on duplicate applications concerning R&D proposals called for the JST-Mirai program in fiscal year 2019.

Certain measures may also be taken for unreasonable duplication or concentration for other projects inside and outside JST that are not described here. See “4.2 Measures for unreasonable duplications and concentration” for details.

<Common to Small-start type and Large-scale type themes>

(1) A Principal Investigator (PL/PM) is only allowed to apply one proposal for every prioritized/Technology Theme of the Small-start type and the Large-scale type.

(2) Applicants who are at the research representative (PM) of this project at the time of proposal cannot apply.

However, if the R&D period of that R&D proposal is scheduled to be completed within the FY2019, it is possible to apply. In case the proposal is continued as a result of evaluation or as a full-scale research onwards, the research representative needs to adjust the R&D period, etc. respectively so that the proposals not to be multiple ones.

(3) The following restrictions are imposed on R&D proposals if the main joint researcher participates in research:

a. Multiple applications are not allowed in which the Principal Investigator and the main joint researcher exchange positions.

b. If a person participates in two or more R&D proposals as a Principal Investigator or a Lead Joint Researcher and multiple R&D projects are adopted, the R&D supervisor takes into account the contents and scales of the research to make adjustments, such as decreasing R&D budgets or disapproving some of the R&D projects in which the researcher participates.

<Only applies to “Realization of a Low Carbon Society, a global issue” area (Small-start type)>

A “present Principal Investigator” of advanced low carbon technology development, a strategic creative research promotion project, is not allowed to apply for the JST-Mirai program (Small-start type) in the “Realization of a low carbon society” area (except for the case that the R&D period for the R&D project ends within fiscal year 2019).

2.3.3 Selection method

See “Solicitation and Selection Schedule” on the cover for the schedule related to selection.

(1) Selection process

The R&D supervisor cooperates with the R&D management committee to review documents, and conducts interviews in order to make a selection. She/he may also seek cooperation from outside evaluators.

Document-based selection for Small-start type proposals may perform a first-stage selection mainly based on the proposal document “R&D Project Description – form 2” of the Small-start type R&D by Prioritized Theme, depending on the number of applications.

This first stage selection is mainly based on whether a proposal meets the purpose of the Prioritized Theme (whether it is promising for achieving the objective of the Prioritized Theme) and on the viewpoint of whether it meets the objective of the Small-start type. Only proposals that meet the criteria proceed to full document-based selection by the "R&D plan of Feasibility Study – Form 3."

The first stage selection is only for the Small-start type. When the first stage selection is conducted, it is not announced to the public.

In addition, surveys besides the above may be conducted if necessary, for selection. Furthermore, if the Principal Investigator or a main joint researcher is affiliated with a commercial organization, submission of a financial statement may be requested.

JST selects Principal Investigators and R&D projects on the basis of the above selection.

Names of R&D management committee members are announced on the website of this project as soon as it is decided. However, this is not to guarantee that all of the names will be announced by the end of the selection.

Prioritized Themes and Technology Themes: https://www.jst.go.jp/mirai/jp/

(2) Managing the conflicts of interest (Persons engaged in selection)

To achieve fair and transparent evaluation and research fund allocation, JST will manage the conflicts of interest as follows in accordance with JST's rules.

1) Managing conflicts of interest of those involved in selection

For fair and transparent evaluation, the following stakeholders are not to participate in the selection of R&D proposers, etc.

a. Those who are in kinship with an R&D proposer
b. Those who are affiliated with the same department or laboratory of an R&D institute of a university or a national R&D agency or the same department of the same private firm with an R&D proposer
c. Those who currently conduct joint R&D closely related to an R&D proposer the like, or who conducted joint R&D closely within past five years.
   (For example, conducting a joint project, writing a joint research paper, research members for the same objective, or those considered affiliated with a research group that is substantially similar to that of a R&D proposer)
d. Those who were in a close teacher-student relationship or in a direct employment relationship with an R&D proposer for more than 10 years in total.
e. Those who are in an academically or commercially competitive relationship with the R&D projects of an R&D proposer.
f. Others who are judged to be stakeholders by JST

2) Managing conflicts of interest of R&D proposer

If a R&D proposer makes a research proposal with a "R&D proposer-related organization" specified as a joint research group, and JST allocates research funds to the latter, it may cause a conflict of interest.

Consequently, JST properly determines and manages the conflicts of interest between the two in consideration of the necessity, rationality and appropriateness of doing so to avoid any doubt from third parties.

The “R&D proposer-related organizations” refer to the joint research group that meet any of the following. For “a” and “b,” not only R&D proposer but also the spouses and relatives within the first degree of R&D proposer (hereinafter collectively referred to as “R&D proposer, etc.”) shall be handled as follows:

a. An organization established based on the R&D results of “R&D proposer, etc.”
   (including the cases where the R&D proposer, etc. is not directly involved in management and only holds the title of a technical adviser, or where the R&D proposer, etc. only hold shares.)
b. An organization where the “R&D proposer, etc.” is appointed as an officer (including CTO but not a technical advisor).
c. An organization where the “R&D proposer” holds shares.
d. An organization from which the “R&D proposer” earns royalty income.
e. Others who are judged to be stakeholders by JST

JST will deliberate a research proposal with a “R&D proposer-related organizations” specified as a joint research group at an R&D management committee from the perspective of necessity, rationality and appropriateness of doing so.

To specify a “R&D proposer-related organizations” as a joint research group, the applicant is requested to declare that the “R&D proposer-related organizations” is listed in the joint research groups in the proposal form 1.

JST may request applicants to submit additional documents to manage the conflicts of interest of R&D proposer.

3) Managing conflicts of interest of JST

Adopting a JST-invested company (hereinafter referred to as the “invested company”) for the program, and allocating research funds to the invested company may fall under the JST’s conflicts of interest. To avoid this, JST will implement management of the conflicts of interest to avoid any doubt from third parties related to JST and the invested company.

JST will deliberate a research proposal with a JST invested company at the R&D management committee from the perspective of necessity, rationality and appropriateness of selecting the invested company.

JST manages the conflicts of interest to secure its fairness and transparency, and does not handle a JST-invested company unfavorably.

* For JST-invested companies, visit the following website:
  https://www.jst.go.jp/entre/result.html#M01
* For the JST-invested companies that are publicized, please visit the following website:
  https://www.jst.go.jp/entre/news.html

(3) Interviews for selection and notice of selection results

a. An R&D proposer who is selected for interview as a result of document-based selection receives such a notice and is informed on guidelines for interview, schedule, and additionally requested information materials. Submission of applications and plans for other research funds may also be requested at the time of the interview. JST and the R&D supervisor may contact proposers subject to interviews concerning matters for which explanations are requested at the interview, depending on results of document-based selection and surveys. If a Principal Investigator or a Lead Joint Researcher is affiliated with a commercial organization, submission of a financial statement may be requested.

   The interview schedule will be announced on the website that publicizes the calls for R&D proposals as soon as it is decided.

   https://www.jst.go.jp/mirai/jp/open-call/research/r01/

b. An R&D proposer whose proposal is not adopted at document-based selection revives a notice of the selection result from e-Red in the e-mail. Please make sure your e-mail address is setup to "receive" an "e-mail about the selection result" from e-Rad. The reasons why the proposal was not adopted are mailed separately.

c. The R&D proposer her/himself is requested to explain the contents of the proposal at the time of the interview. Interviews are in principle conducted in the Japanese language. However, if a proposer finds it difficult to explain a proposal in Japanese, she/he may explain it in English.

d. For a proposal candidate to be adopted as a result of interview selection, it may be subject to adjust the R&D plan and team, as well as conditions of an R&D agreement. If a proposer does not agree to these conditions, his/her proposal shall be declined.

e. An R&D proposer whose proposal is adopted through the said selections receive a written notice as well as a procedure for R&D initiation.

f. An R&D proposer whose proposal is not adopted as a result of interview selection receives a written notice or an e-mail of the selection result from e-Rad after all selection process is over. The reasons why the proposal was not adopted are mailed separately.

Chapter 3
Selection Perspective
(Common to Small-start type and Large-scale type themes)

3.1 Preparing a R&D Plan

a. Once selected, project leader and program manager (PL/PM) will be requested to an overall R&D plan covering the entire R&D project period.

   PL/PM will be also requested to prepare overall and annual R&D plans. R&D plans include information on the R&D cost and team structure.

   Actual R&D costs are determined after confirmation and approval by R&D Supervisor (PO) when an annual R&D plan is prepared.

b. R&D plans (overall and annual plans) become official once they are checked and approved by the PO. The PO will offer advice and coordination assistance on the R&D plan, and provide instructions when necessary, based on information the PO gains through, for example, the project selection process, discussions with PL/PMs, regular progress updates, and the results of R&D evaluations.

c. The PO, in approving R&D project plans to achieve objectives including the accomplishment of the overall objectives of Prioritized Themes and technical themes, may merge or link R&D projects, or take other coordinative actions.

   * R&D institutes and costs set forth in R&D plans may be revised during the R&D project period in response to the Prioritized and Technology Themes management actions taken by the PO, factors like results of R&D evaluations, or overall JST-Mirai program budget conditions.

3.2 R&D agreement

a. Once a R&D project is selected, JST will enter into a contract R&D agreement with the R&D institutions with which the PL/PM, Lead Joint Researcher are affiliated.

b. If it is not possible to conclude R&D agreements with these research institutions, or not possible to put in place the management and audit systems required in connection with the use of public funds, or it the subject R&D institutions are conspicuously financially unstable, it may be impossible to pursue R&D at the subject R&D institutions. For more details, please refer to "3.5 Responsibilities of R&D Institutions".

c. In principal, patents and other intellectual property rights resulting from R&D shall, in accordance with contract R&D agreement terms, reside with R&D institutions under the condition that the R&D institutions abide by the items provided in Article 17 (Japanese version of the Bayh-Dole Act) of the Industrial Technology Enhancement Act. However, this rule does not apply to foreign R&D institutes.

3.3 R&D costs

JST will pay research institutions an R&D agreement cost, which is defined as the sum of the R&D costs (direct costs) and overhead (indirect) costs, which in principle is 30% of the direct costs.

3.3.1 R&D Costs (Direct Costs)

R&D costs (direct costs) means costs that are directly related to and required for the pursuit

of the subject research. R&D costs can include:

a. Commodities: Costs for the purchase of new facilities*[1], equipment, consumable supplies, etc.
b. Travel Expenses: Expenses for travel by the Principal Investigator, Lead Joint Researcher, R&D participants listed on the R&D plan and Individual Researcher.
c. Personnel costs: Salaries for research participants (excluding the Principal Investigator, Lead Joint Researcher) and honorariums.
d. Other Expenses: Costs related to the presentation of research results (research paper submission fees, etc.), costs for leasing and transferring of equipment, etc.

*1 The purchase of new research equipment and apparatuses will proceed according to the "Research Equipment and Apparatus Sharing Systems for Research Organization Units" (hereinafter referred to as "apparatus sharing systems"), which shall operate on the premises of "Introduction of New Research Equipment and Apparatuses Operating Integrally with Research Organization Management" (Advance Research Fundamentals Working Group, Scholarship Commission, November 2015). Please refer to "4.14 Promoting the joint use of research facilities and equipment" for details.

(Note) The following costs are examples of those not treated as R&D budgets (direct cost):
- Costs for items not consistent with the research objectives.
- Costs that are considered to be more appropriately handled as overhead cost (indirect cost).
- Costs that is determined by JST to be unauthorized use at the time of settlement).*[2]

*2 For certain items, JST has created specific rules and guidelines for the program from sources like the R&D agreement, administration manuals, and a common governmental expense categorization table. Universities, etc. (Universities, public research institutions and public-service corporations recognized by JST) and companies (mainly research institutions operated by private companies) may differ in their handling of administrative matters. For more details, please refer to the following URLs (only in Japanese).

https://www.jst.go.jp/contract/index2.html

<MEXT: Table of expense classification common to prefectures (2019 JST-Mirai program)>
https://www.jst.go.jp/contract/download/2019/2019mirais309betsu190401.pdf

* In hiring research staffs, please refer to "3.4 Responsibilities of Principal Investigator, Lead Joint Researchers," "4.15 Improving the treatment of (latter-stage) doctoral students" and "4.16 Supporting various career paths for young post-doctoral researchers."

3.3.2 Overhead (Indirect) Costs

Overhead (indirect) costs are costs required for the management, etc. of research institutes pursuing research; they are in principle 30% of R&D budgets (direct costs). According to "Common Guidance for the Execution of Indirect costs of the Competitive Fund" (agreed upon by the coordination committees of relevant ministries and agencies in April, 2001 and revised on May 29, 2014), regarding indirect costs, a policy on use, etc. shall be created and shall be systematically and properly executed to ensure that use is transparent.

3.3.3 Multiple-year contract and Carryover

From the perspective of the effective and efficient use of R&D budgets to maximize research results and prevent unauthorized use, in order to be capable of carrying over R&D budgets and procurement contacts over financial years, JST has made R&D agreements into multiple-year contracts. With regard to carrying over, universities are treated differently from business firms. In addition, multiple-year contract or carrying over may not be acceptable to the office management system of some research organizations.

3.3.4 Diversion of direct cost among items

Under certain requirements, flexibility can be diverted between expense items.

- Requirement of confirmation of JST is not required, requirements that can be diverted.

  When the diversion amount by each expense does not exceed 50% (when this amount is less than 5 million yen it is 5 million yen) of the direct costs in the relevant fiscal year.

  * JST confirmation is required beforehand if accompanied by a significant change in research plan.

- Requirements for confirmation of JST.

  JST pre-approval is required when the amount of diversion in each expense exceeds 50% of the total direct costs and 5 million yen in that year. Please note that diversion between direct and indirect costs is not permitted.

3.4 Responsibilities of Principal Investigator, Lead Joint Researchers

(1) Research Directors, Lead Joint Researcher, and Individual Researchers are responsible for fully recognizing that JST R&D costs are funded by precious tax revenues collected from citizens, and for fairly and efficiently executing budgeted expenditures.

(2) Once a proposed research project is selected, the Research Director and Lead Joint Researcher shall affirm that they will fulfill the following requirements, presented to them via JST briefings and other means, and submit to JST a written document evidencing this affirmation.

a. Comply with application guidelines and other requirements.

b. Pledge not to become involved in research misconduct (fabrication, falsification, plagiarism) or in the improper use of R&D budgets, upon understanding that the budgets

are covered by taxes.

c. To prevent any research misconduct and improper use of R&D budgets, enroll in and complete the JST-specified research integrity educational program (eAPRIN (formerly CITI)) and promise to educate the research participants of the obligation to enroll in and complete the program and make them understand.

For details refer to "4.1 Enrolling in and Completing the Educational Program for Research Integrity." Note that failure to complete the research integrity educational program in c. above can result in the suspension of the R&D cost until confirmation has been made that the program has been completed.

(3) The Research Director and research participants are required to complete the research integrity educational program (eAPRIN (formerly CITI)) specified by JST to prevent research misconduct (fabrication, falsification and plagiarism). For details, refer to "4.1 Enrolling in and Completing the Educational Program for Research Integrity."

(4) Promotion and management of R&D

a. The Principal Investigator is held responsible for the whole R&D team, with responsibilities including preparation and implementation of a R&D plan. The Principal Investigator needs to comply with "Basic policies for the management of Intellectual Properties," conclude "Treaty of mutually owned intellectual properties," and cooperate with R&D institutions in order to promote proper activities for intellectual properties.

The Principal Investigator is responsible for cooperation with R&D institutes to provide an R&D site and research environment necessary for R&D promotion. When serious obstruction of R&D implementation location and environments to promote research is found, R&D project may be cancelled.

"Basic policies for the management of Intellectual Properties"
https://www.jst.go.jp/mirai/jp/manual/index.html

b. R&D teams shall also be responsible for submitting R&D reports and other required documentation to JST and Research Supervisors and taking steps required for &D evaluations. R&D teams shall also be responsible for providing the progress and other reports the Research Supervisor may request from time to time.

(5) Principle Investigators together with R&D institutions shall appropriately manage (expenditure planning, monitoring, etc.) overall R&D costs for R&D teams. Lead Joint Researcher together with R&D institutions shall appropriately manage (expenditure planning, monitoring, etc.) R&D costs for his/her own R&D team. When students join to R&D team, their academic supervisors are also held responsible as "research monitors" for the terms and conditions of the R&D agreement with JST. If, for example, a student researcher has committed misconduct or other improprieties as defined by Article 13 of the contract research agreement, both the student and the academic supervisor will be held accountable.

(6) Principle Investigators and Lead Joint Researcher are asked to be mindful of research and working environments and conditions for their own group's research participants, and research staff and others whose employment is being funded by R&D costs.

(7) It is recommended that Research Director Principle Investigators and Lead Joint Researcher actively support the development of varied domestic and international career paths for research staff who have recently completed doctoral programs and are being employed with R&D costs. In the research project selection interview, research project applicants will be asked about plans*1 for supporting the development of varied domestic and international career paths for research staff who have recently completed doctoral programs and will be employed with R&D costs.

(Please refer to "4.15 Improving the treatment of (latter-stage) doctoral students" and

“4.16 Supporting various career paths for young post-doctoral researchers.”)

*1 Some of the activities based on the career support activity plan may be included in the research effort.

(8) Handling of Research Results

a. Given that R&D results were obtained with national government funding, it is asked that R&D results are actively reported on both domestically and internationally, with due consideration for the acquisition of intellectual property rights. It is also asked that active efforts be made to secure intellectual property rights under the “Basic policies for the management of Intellectual Properties.” In principle, intellectual property rights are to be applied, in accordance with R&D agreement terms, by the research institutions with which researchers are affiliated.

b. When reporting on R&D results through research papers or other media, please indicate that the results were obtained via the JST-Mirai program (Small-start type, Large-scale type).

c. The Principle Investigator is asked to submit to JST a data management plan that sets forth policy on storage, management, publicity and non-publicity in regard to research data obtained from research team activities and research data to be made public for each of the items below, together with a research plan document. Further, data storage, management, and publishing based on the above policy are requested.
For details regarding the following entries, please refer to the “Guideline of the JST’s basic policies for handling research achievements toward an open science promotion” below.
https://www.jst.go.jp/pr/intro/openscience/guideline_openscience.pdf

<Entries in the data-managing plan>
- Policy on the storage and management of research data to be managed
- Policy related to publicity and non-publicity in regard to research data
- Providing methods and systems for data to be made public
- Assumed use applications for public research data
- Initiative for the promotion of the use of public research data
- Other items of note

d. The adopted researcher is requested to participate in the workshops and symposia that JST holds in Japan and overseas, interdisciplinary activities and outreach activities aiming for the promotion of R&D collaboration and synergy in Prioritized Themes, Technology Themes and areas of this program with researchers of the R&D group. In addition, she/he is expected to actively promote global activities and issue information while promoting R&D activities.

(9) Researchers are asked to actively engage citizens in discussions of science and technology to promote citizen's understanding and support of science and technology. Efforts to engage citizens in discussions of science and technology will be evaluated both interim and post-completion evaluations.

* Please refer to the guideline details in "4.12 Promotion of dialogue and collaboration with the public."

(10) Researchers shall abide by R&D agreements entered into by JST and research institutions, and shall abide by JST's various rules.

(11) It should be noted that JST will provide research project names, names of researchers, R&D cost information, and other required information to the Cross-ministerial R&D Management System (e-Rad) and the Government Research and Development Database ("4.21 Handling of Information Regarding Selected Projects" and "4.22 Provision of Information from the Cross-ministerial R&D Management System (e-Rad) to the Government Research and Development Database"). Principle Investigators and others, therefore, may be asked to provide various types of information in that connection.

(12) Researchers will cooperate with accounting examinations by JST, accounting audits by the national government, and similar activities.

(13) Researchers will cooperate with JST-Mirai Program evaluations. Researchers will cooperate by providing various types of information, responding to interviews, etc. in connection with follow-up evaluations performed sometime after project completion.

3.5. Responsibilities of R&D Institutions

Research Institutions must fully recognize that the research funds are public funding, ensure compliance with related law, and make efforts to implement the research effectively upon implementation. Research institutes that cannot accomplish the tasks described below will not be enjoined to implement research; thus, when applying, the prior consent of all research institute (hereinafter referred to as the participating organization) at which the implementation of research is planned shall definitively be obtained.

(1) For Domestic Institutions

a. Research organizations shall conclude the R&D agreement with the content proposed by JST. Further, research institutes are responsible for properly implementing research in accordance with the R&D agreement document, administrative process document, and research plan. When the agreement cannot be concluded, or when it is judged that research at the research institute is not being implemented properly, the implementation of research at the research institute shall not be admitted.

* For the latest sample of the R&D agreement document, please refer to the URL below.
https://www.jst.go.jp/contract/index.html

b. Research institutions, with an autonomously instituted management and audit system for public research budgets, are obligated to properly execute the contract research funds in

accordance with the “Guidelines for Management and Audit of Public Research Funds at Research Institutions (implementation standards)” (decided by the Minister of Education, Culture, Sports, Science and Technology on February 15, 2007; revised on Feb. 18, 2014). Research institutions, in addition to reporting the status of their management and audit system for public research budgets to the Ministry of Education, Culture, Sports, Science and Technology (MEXT), are also obligated to support various investigations into their system implementation and other related matters.

* 4.18 Regarding implementation of systems based on the "Guidelines of Management and Audit of Public Research Funds in Research Institutes (Implementation standards)”
  http://www.mext.go.jp/a_menu/kansa/houkoku/1343904.htm

c. In accordance with the “Guidelines for Responding to Misconduct in Research” (August 26, 2014, adopted by the Minister of Education, Culture, Sports, Sciences and Technology), research institutes are asked to construct necessary regulations and systems that they are responsible for in order to prevent misconduct. Research institutes are responsible for responding to various investigations relating to systems construction based on the guideline.

   * 4.19 Regarding implementation of systems based on the “Guidelines for Responding to Misconduct in Research”
     http://www.mext.go.jp/b_menu/houdou/26/08/1351568.htm

d. Research institutes are responsible for ensuring that research participants fully recognize the contents of the above guideline described in b and c and have been trained with teaching materials related to research ethics provided by JST.

e. Research institutes shall expend and manage R&D budgets properly in accordance with the regulations of the research organization while considering flexibility; when items are regulated by administrative process documents, etc., provided by JST, which state rules specific to the program, the rules shall be obeyed. (For research institutes receiving Grants-in-Aid for Scientific Research expenses, it is possible that items not described in administrative process documents for use in R&D budgets may be handled in conformity with the Grants-in-Aid for Scientific Research expenses.)

f. Research institutes shall either enter into contracts with associated researchers that ensure that intellectual property rights resulting from the implementation of research will be accorded to the research institutes or construct work regulations in this vein. In case a student who is not employed by a research organization participates in research, a necessary measure, such as concluding a contract with the student in advance, needs to be taken in order for pertinent intellectual property right associated with the invention (including ideas) that the student made during the research to belong to the research organization unless it is clear that the student cannot be an inventor. Take into consideration eliminating conditions unfavorable to the student, the inventor, concerning the price of transferring the intellectual property right.

   In addition, when intellectual property rights are transferred, exclusive licenses are granted, etc., in principle, the prior approval of JST is needed, and when application, registration, implementation, and renunciation are conducted, a prior report to JST is needed.

g. Research institutes are responsible for responding to accounting investigations by JST and account audits by the Government.

h. Research institutes shall obey measures pertaining to changing terms of payment and will accept decreased payments on R&D budgets decided upon by JST based on JST investigations related to administrative managing systems, financial conditions, etc.

   Depending on the results of the project evaluation at the end of the JST's mid and long-term objective periods, it may be called for dissolution or contraction. In the case of any changes to national budgetary measures, JST may take such measures as contract termination or reduction in contract research expenses, during the term of the contract pursuant to the special provisions of the contract R&D agreement. Based on the results of the mid-term evaluation, etc. of the research subject, JST may take measures, such as changing the contract research funds or the contract period or cancelling the research. If JST determines that the continuation of research is not appropriate, it may take measures, such as cancellation of the contract even during the term of the contract. The research institutes need to accept these measures.

i. When research institutes are national or municipal organizations, such institutes concluding R&D agreements must definitively implement necessary budgetary measures before starting R&D agreements for which they are responsible. (In case it becomes apparent that the non-fulfillment of necessary procedures after contracting will occur, measures to release the R&D agreement and rescind R&D budgets will be taken.)

j. As part of the effort to prevent misconduct in research and development activities, JST has required researchers, who are part of newly selected research projects and who also are affiliated with a research institution, to enroll in and complete the educational program on research integrity (The procedures required for enrollment will be handled by JST). Research institutions are to supervise, without fail, the enrollment in and completion of the program by the relevant persons.

   In the event that the relevant researchers fail to complete the educational program as stipulated despite repeated reminders by JST, JST will instruct the research institution to halt, partially or entirely, the execution of contract R&D budgets payments. In line with this instruction, the research institution is to halt all use of the R&D budgets and not restart their use until further notice from JST.

k. Take necessary measures, such as concluding a joint research contract with participating organizations within a range of R&D agreements with JST concerning handling of intellectual property rights or confidentiality in order to avoid problems in properly undertaking research or utilizing research achievement.

l. Since the contract R&D budgets are funded by national funds, the research institutes shall take appropriate measures to fulfill their accountability in consideration of economics, efficiency, effectiveness, legality, and accuracy. The research institutes shall strive to execute them in accordance with a plan and shall not procure something to consume budgetary funds at the end of the R&D period or at the end of the fiscal year.

(2) For Overseas Institutions

a. In principal, R&D institutes shall conclude R&D agreements with content proposed by JST. (Indirect costs are capped at 30% of direct costs.) Further, research institutes are responsible for proper implementation of the research in accordance with the R&D agreement document and research plan. When agreements cannot be concluded, or when it is judged that research at the research organization will not be properly implemented, the implementation of research at the research organization shall not be admitted.
   * A sample of an R&D agreement document for overseas institutes is in preparation. If necessary, please contact us by e-mail to the inquiries found at the end this Application Guideline.

b. R&D institutes are responsible for properly disbursing and managing R&D budgets for which they are responsible based on the R&D agreement, guiding principles, etc. When JST designates guiding principles, etc. separately; they are responsible for creating and reporting expense details (for domestic organizations, this corresponds to accounting books) in English. Research institutes shall respond to various investigations related to implementation status per JST request in the period of the agreement.

c. Research institutes shall transfer intellectual property rights resulting from research without compensation (Article 17 of the Industrial Technology Enhancement Act, the Japanese version of the Bayh-Dole Act, will not apply to overseas organizations). Accordingly, when an invention is made, which may be subject to intellectual property rights, the institutes shall notify JST of it immediately (within 10 business days).
   * From the view of the point of Security Export Control, JST may not conclude joint research agreements with such institutions as Japanese Ministry of Economy, Trade and Industry (METI) announces in the “Foreign User List” (or “End User List”).

3.6 Evaluation

Refer to "Flow of R&D management" in "Chapter 2 Call for Proposals and Selection (Small-start type and Large-scale type)" for each project type.

3.7 Other Considerations

3.7.1 Childbirth, Child Care and Nursing Care Support System

JST implements the childbirth, child care, nursing care support system as part of its efforts to promote gender equality. The system is intended to allow a full-time employed researcher who receives R&D budgets (direct costs) for a JST project to continue her research despite her life events (childbirth, child care or nursing care) or continue her career after returning to her research if she had to suspended her research temporarily. In the system, JST pays “gender equality promotion costs” (upper limit: monthly amount 250,000 yen × number of support months) for R&D project.

For details, please visit the following website:
https://www.jst.go.jp/diversity/about/research/child-care.html

3.7.2 Using JREC-IN Portal

The Researcher Human Resources Database (JREC-IN Portal: https://jrecin.jst.go.jp/) is one of the largest portal sites supporting the career of research human resources in Japan. It is a free service to carry information on human resources including researchers, their supporters and engineers for viewing.

At present, the database has more than 130,000 registered users, and publishes more than 19,000 annual job postings for universities, public research institutes, private companies, etc. To find research personnel (post doctors, researchers, etc.) having an advanced knowledge in promoting research projects, please use the JREC-IN Portal.

The JREC-IN Portal is linked with a researchmap, allowing you to log in to the portal with the ID and password of the researchmap, and provides a function to create a resume or achievement list. The function allows you to create a necessary form using the information registered to the researchmap.

Chapter 4

Key Points for Application

4.1 Enrolling in and completing educational program on research integrity

A research proposer must complete the educational program on research integrity before he/she can apply for public invitation. If JST cannot confirm his/her completion, he/she is considered to have failed to meet the application requirements.

To enroll in the educational program on research integrity and to submit a declaration of completion, follow either procedure (1) or (2) below. For how to enter with e-Rad, please refer to Chapter 5 “Submission via the Cross-ministerial R&D Management System (e-Rad)”.

(1) For applicants who have completed an equivalent program at their organization

Applicants who have already completed an e-learning program or educational seminar on research integrity (including eAPRIN (formerly CITI)) by the time of their application are requested to declare the completion on the e-Rad application information entry screen.

(2) For applicants who have not completed an equivalent program at their organization (including for applicants at their organization that do not have such a program)

a. If applicants have completed eAPRIN (formerly CITI) in the past JST project, etc.

Applicants who have completed eAPRIN (formerly CITI) at the time of application for JST projects are requested to declare the completion on the e-Rad application information entry screen.

b. Other than “a” above

Applicants who find it difficult to enroll in an educational program on research integrity because their organization does not offer such a program or for other reasons may enroll in and take the condensed version of the eAPRIN (formerly CITI) through JST. For instructions on enrolling in this program, visit the website of “Public Invitation of R&D Proposals”:

https://www.jst.go.jp/mirai/jp/open-call/research/r01/

Applicants are requested to enroll in the program from the following URL:
https://eduprv.aprin.or.jp/jstshinsei.html

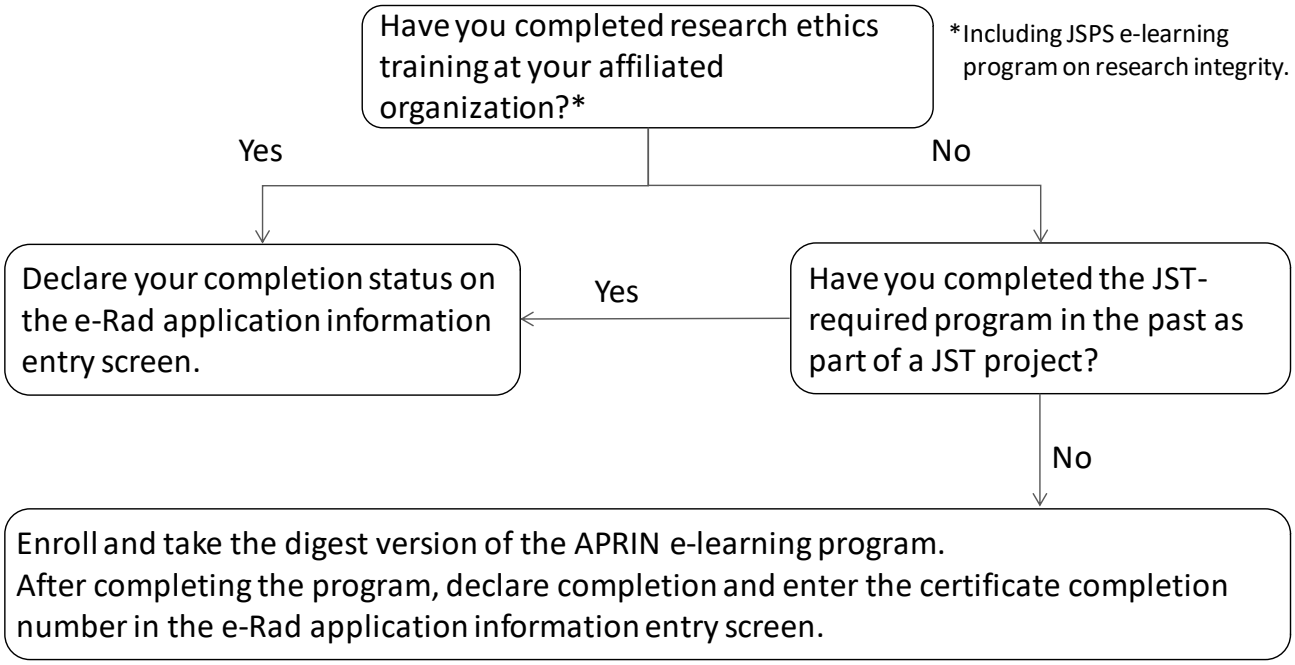
No cost is incurred for enrolling in and attending the program, which takes about one to two hours to complete. Once enrolled, applicants are expected to attend and complete the program without delay, declare the completion of the program, and enter the certificate completion number from the completion certificate (the Ref # to the right of the completion date) in the e-Rad application information entry screen.

■ Contact for consultation over the educational program on research integrity

Research Integrity Division, Department of Audit and Legal Affairs, Japan Science and Technology Agency
E-mail: rcr-kousyu@jst.go.jp

■ Contact for consultation over the public invitation for application
Department of R&D for future creation, Japan Science and Technology Agency
E-mail: kaikaku_mirai@jst.go.jp
* Include the program name, e-Rad project ID, research applicant name and project name in the body of email.

Flow chart for declaring enrollment and completion of the educational program on research integrity



JST has required researchers participating in this project to enroll in and complete the "eAPRIN (formerly CITI)." Since this requirement will remain unchanged for the next fiscal year, in principle, all research participants will be required to enroll in and complete the eAPRIN (formerly CITI) except those applicants who have already completed it at their organization or in a JST project.

4.2 Measures against unreasonable duplication and excessive concentration

〇Measures against unreasonable duplication

In the case where a researcher is unnecessarily receiving competitive funding from multiple sources by the government or independent administrative corporations (including national R&D agencies) for the same research and development proposal (in terms of its name or the content of research receiving competitive funding; hereinafter the same shall apply) being undertaken by the same researcher and if any of the following applies, the researchers shall be made ineligible to apply for this program, the approval decision for their research project revoked or their research funding reduced (hereinafter referred to as "revoking of the approval decision for the research project").

- In the case where simultaneous proposals have been submitted for multiple competitive research funds and a duplicate approval has been granted for essentially the same research and development proposal (including overlapping cases, the same shall apply hereinafter).
- In the case where a duplicate application is made for funding a research and development proposal that is essentially the same as another research project that has already been selected and received competitive research funding.
- In the case where there is overlap in the intended use of research funds between multiple research and development proposals
- Other cases equivalent to the above

Even at the application stage of this project, no restriction is imposed on the application for other competitive funding programs. However, if the research project is selected by another competitive funding program, it shall be conveyed promptly to the clerk in charge of this project. If there is any omission in this report, the approval decision for the research project may be revoked.

〇Measures against excessive concentration

Even if the content of the research proposed for this project differs from the content of research being carried out under another competitive funding program, in the case where the overall research funding allocated to the same researcher or research group (hereinafter referred to as "researchers") in the relevant fiscal year exceeds an amount that can be utilized effectively and efficiently and cannot be used within the research period, and if any of the following applies, the approval decision may be revoked in this project.

- In the case where an excessive amount of research funding is being received in light of the capabilities of the researchers and the research methods being used, etc.
- In the case where an excessive amount of research funding is being received in comparison with the amount of effort allocated to the research and development proposal (the percentage of working hours required for conducting the relevant research in the total working hours (*))
- In the case where highly expensive research equipment is purchased unnecessarily

・ Other cases equivalent to the above

In the case where you submit proposals to other competitive funding programs after submitting your application for this program and the research project is selected by another competitive funding program or if any information provided on your application changes, it shall be conveyed promptly to the clerk in charge of this project. If reporting is omitted, the approval decision for the research project may be revoked.

* The researcher's total working hours do not only refer to the hours for research activities, but also to substantially all working hours including those for educational activities and management tasks.

Concept of effort

About the definition of effort

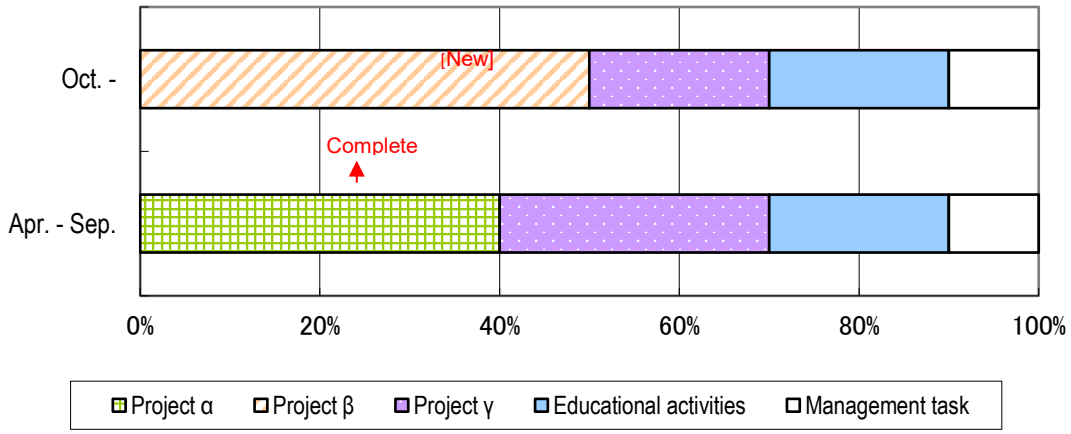
○The 3rd Science and Technology Basic Plan defines an effort as "a percentage of working hours for a researcher to engage in each task, such as research, education, or management."

○When researchers apply for a research subject, they will be asked to indicate "the proportion of the time required for conducting the research to the total working hours." *1

○It is important to note that this "total working hours" include not only the time spent on research activities, but also the time spent on educational activities and management tasks.

○The effort value may be changed according to the review and assessment of the research plan.

Ex.: Percentages of working hours for projects α, β and γ in the total working hours whereby project α is discontinued and project β is adopted in the middle of the fiscal year, and project γ is implemented throughout the year



○The project α ended at the end of September (allocation rate 40%) and the project β was newly started from October (allocation rate 50%) which will change the effort value of the project γ from 30% to 20%.

*1 "Guidelines for Appropriate Execution of Competitive Funds" (agreed upon by the coordination committees of relevant ministries and agencies on competitive funds, revised on June 22, 2017)

〇Providing information on application content to eliminate unreasonable duplication and excessive concentration

In order to eliminate unreasonable duplication and excessive concentration, JST may partially provide information on the application content (or selected research subjects or projects) to persons in charge of other competitive funding programs, including at other ministries and agencies, to the extent necessary, through cross-ministerial R&D Management System (e-Rad). When asked, JST may also provide information in the same way to facilitate these checks at other competitive funding programs.

4.3 Status of acceptance of other applied competitive funds, including of those of other ministries and agencies

If the abovementioned content of the entry is described differently from the facts, it may result in the rejection of a research and development proposal, revoking the adoption of or reduction in research funds.

4.4 Measures against an improper use and improper receipt

JST will respond strictly to an improper use and improper receipt of research funds (hereinafter referred to as an “improper use and the like”) as follows.

〇Measures to be taken when an improper use and the like of research costs is found

(i) Measures to cancel the agreement

For a research subject for which an improper use and the like has been found, JST will cancel or change the consigned contract and request for return of all or part of the consignment expenses. In addition, JST may not enter into a contract for the next and subsequent fiscal years.

(ii) Measures to restrict eligibility for application and participation*1

If a researcher who has made an improper use and the like of research funds of a project (including a researcher who has conspired; hereinafter referred to as a “researcher who made an improper use and the like”) or is accredited to have been involved in the improper use and the like will be regarded as to have violated the duty of due care required of a prudent manager*2, JSL will restrict his/her eligibility for application for or participation in this project or give him/her a strict reprimand as shown in the following table, depending on the degree of injustice.

JST may provide the persons in charge of other competitive funding programs, including those of other ministries and agencies and independent administrative corporations under their jurisdiction, with a summary of the improper use and the like (name of the researcher who has made the misconduct, project name, affiliated organization, research and development proposal, amount of budget, fiscal year of research, description of misconduct, and description of measures that have been taken). [This restricts the

eligibility for application for and participation in other competitive funding programs, including other ministries and agencies.]

*1 The "application and participation" refers to proposal of or application for a new subject, new participation in research as a joint researcher, or participation in an ongoing research and development proposal (continued subject) as a principal investigator or joint researcher.

*2 "A researcher who has violated the duty of due care required of a prudent manager" refers to a researcher who was not recognized as being involved in an improper use and the like but has violated the duty to conduct the project with the attention of a prudent manager.

<table>
<tr><th>Classification of improper use or improper receipt</th><th colspan="2">Degree of improper use</th><th>Application prohibited period *3</th></tr>
<tr><td rowspan="4">Those researchers who engaged in improper use and any researchers colluding in the said improper use *1</td><td colspan="2">1 Personal use for personal gain</td><td>10 years</td></tr>
<tr><td rowspan="3">2 Other than above</td><td>①Major influences on society, or strongly aggravated</td><td>5 years</td></tr>
<tr><td>② Improper use other than ① or ③</td><td>2–4 years</td></tr>
<tr><td>③ Minor influence on society, or weakly aggravated</td><td>1 year</td></tr>
<tr><td>Those researchers awarded competitive funding through false or other improper means and any researchers colluding in the said improper</td><td colspan="2"></td><td>5 years</td></tr>
<tr><td>Those researchers who were not involved in the improper use but were in violation of the requirement to exercise the duty of due care required of a prudent manager *2</td><td colspan="2"></td><td>A minimum of 1 year to a maximum of 2 years according to the researcher's degree of violation of the duty of due care required of a prudent manager</td></tr>
</table>

In the following case, JST gives a strict reprimand, instead of restricting eligibility for applications and participation.

*1 In the case of 1, the act has minor impact on society and is determined to be less vicious and the degree of improper use is small.

*2 In the case of 2, the act has minor impact on society and is recognized as less vicious

*3 The eligibility for participation is also restricted for the fiscal year in which the fraudulent use and the like have been determined as such.

(iii) About publication of fraudulent case

For the researchers, who have made a fraudulent use and the like of research funds and violated the duty of due care required of a prudent manager in this project, are subject to restrictions on eligibility for application for and participation in it. JST will publicly disclose the overview of the fraudulent case (researcher name, project name, affiliate organization, fiscal year of research, description of misconduct, and description of measures that have been taken). The overview of the fraudulent case (project name, affiliate organization, fiscal year of research, content of misconduct, and description of measures that have been taken) is also released, in principle, by the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

"Guidelines for Management and Audit of Public Research Funds in R&D institutes (Implementation Standards)" states that if the misconduct is found and determined as a result of the survey, the R&D institute is required to announce the survey results promptly. Each organization should act properly in accordance with the guidelines.

* For the outline of the misconduct cases currently published on the website of MEXT, please refer to the following URL.
http://www.mext.go.jp/a_menu/kansa/houkoku/1364929.htm

4.5 Measures taken against researchers whose eligibility for applications and participation have been restricted under other competitive funding programs

For researchers who have been restricted due to the fraudulent use and the like of research funds in other competitive funding programs* of the government or independent administrative corporations are also restricted on eligibility for application for and participation in this project during that restriction period.

The other competitive funding programs also include ones for which public invitation will start from the fiscal year 2019.The other competitive funding programs also include ones for which public invitation ended before the fiscal year 2018.

* For specific target competitive funding programs, please visit the following website:
https://www8.cao.go.jp/cstp/compefund/

4.6 Measures taken against violation of related laws and regulations

If research is conducted in violation of the relevant laws and regulations or guidelines, the researcher will be subject to disposal and penalties pursuant to the laws and regulations, the termination of research fund allocation, or revoking of the decision on research fund allocation.

4.7 Storage of receipts pertaining to indirect costs and report on actual use

R&D institutes that receive allocated indirect costs are requested to manage them properly

and store documents, such as receipts, that prove their appropriate use for five years from the fiscal year following the fiscal year of project completion.

R&D institutes that have received the allocated indirect costs should report their actual use for each fiscal year by June 30 of the next fiscal year to JST through the cross-ministerial R&D Management System (e-Rad) (Research institutes that have acquired multiple competitive funds are requested to report all the indirect costs relevant to them).If you do not know how to operate e-Rad for reporting, refer to e-Rad Operation Manual (https://www.e-rad.go.jp/manual/for_organ.html) or “Frequently Asked Questions.” (http://faq.e-rad.go.jp/EokpControl?&event=CE0002&cid=13593).

4.8 About carryover

If a research institute finds it difficult to finish spending its research fund within the fiscal year along with the progress of the project due to difficulties in prior investigation or determination of research methods, various conditions related to planning or design, weather conditions, difficulties in obtaining materials or for other unavoidable reasons, JST may allow the research fund to be carried over to the end of the next fiscal year.

4.9 About cross-ministerial cost categorization table

In this project, the cost structure is determined based on the cross-ministerial cost categorization table that is to be commonly used for competitive funds. For the handling of costs, please refer to the following cross-ministerial cost categorization table.

https://www.jst.go.jp/contract/download/2019/2019mirais309betsu190401.pdf

4.10 Diversion of cost among items

For diversion of cost among the items, the amount of diversion permitted without JST approval is capped at 50% of the total direct costs.

4.11 Securing research period up to the end of fiscal year

JST takes the following measures for all the competitive funds so that researchers can conduct their research until the end of the fiscal year.

(1) R&D institutes and researchers shall submit a project completion notice as an outcome promptly after the completion of the project. JST will confirm it and perform acceptance inspection of the research results.

(2) The deadline for submitting the accounting performance report shall be May 31.

(3) The deadline for submission of the research results report shall be May 31.

Each R&D institute should strive to establish a necessary system based on the understanding that these measures are taken to secure the research period which ends at the end of the fiscal year.

4.12 Promoting dialogue and collaboration with the public

In Promoting "Dialogue on Science and Technology with the Public (Basic Approach Policy)," adopted on June 19, 2010 by the Minister of State for Science and Technology Policy in charge and by the decision of the expert diet members, it is considered essential for a selected research project to receive a minimum of JPY 30 million per year of public research fund (competitive or project research fund) to fulfill the following objectives: 1) Achieve continued excellent results in the field of science and technology through the Dialogue on Science and Technology with the Public, 2) Return the achievements in science and technology to the public for further development of the field in Japan, and 3) Promote science and technology jointly with the public, while obtaining their understanding and support. In the "5th Science and Technology Basic Plan," as decided by the Cabinet on January 22, 2016, it is required to deepen the relationship for dialogue and collaboration among various stakeholders, such as researchers, the public, media, industries, and policy makers. Such relationship is considered as a "joint creation," and is contrary to the conventional relationship in which science and technology and society stand opposite each other. From these points of view, an approach is required to explain the contents and achievements of research activities to society and public in the most widely understandable manner possible. To this end, researchers are required to actively undertake the continuous releases of research achievements through lectures, symposiums, and the internet, and full activities involving diverse stakeholders in the roundtable meetings.

(Reference) Promoting Dialogue on Science and Technology with the Public (Basic Approach Policy)
https://www8.cao.go.jp/cstp/output/20100619taiwa.pdf

(Reference) "5th Science and Technology Basic Plan"
https://www8.cao.go.jp/cstp/kihonkeikaku/5honbun.pdf

4.13 Releasing data from National Bioscience Database Center

The National Bioscience Database Center (NBDC) (https://biosciencedbc.jp/) was established in the Japan Science and Technology Agency in April 2011 to promote integrated use of life sciences databases created by various research institutes. "Progress of Life Sciences Database Integration Promotion Project and Future Directionality" (January 17, 2013) states that the center will play a central role in expanding the target projects receiving data and services from the database.

Based on the understanding of these circumstances, researchers are requested to cooperate in publishing the following types of data obtained from this project and databases.

No.	Data type	Publication destination	Publication URL
1	Overview of public database that has been built	Integbio Database Catalog	https://integbio.jp/dbcatalog/
2	Copies of data related to the results published in the papers	Life Science Database Archive	https://dbarchive.biosciencedbc.jp/

No.	Data type	Publication destination	Publication URL
	etc. or a copy of the public database that has been built		
3	Date related to human of above 2	NBDC Human Database	https://humandbs.biosciencedbc.jp/

＜Contact information＞

National Bioscience Database Center, Japan Science and Technology Agency

Phone: 03-5214-8491

e-mail: nbdc-kikaku@jst.go.jp

4.14 Promoting the joint use of research facilities and equipment

"About reforming competitive research expenses toward sustainable creation of research achievements (mid-term summary)" (Committee for reforming competitive research expenses, June 24, 2015) considers it proper to share relatively large facilities and equipment for universal use while aiming to fully achieve the research objectives.

In addition, "About introduction of a joint use system for new research facilities and equipment integrated with research organization management" (Advanced Research Base Subcommittee, Council for Science, Technology, November 2015) requests that universities and national research and development corporations should operate a "joint use system for research facilities and equipment for each research organization unit" (hereafter referred to as "equipment joint use system").

Based on these, research institutes are requested to promote joint use of research facilities and equipment purchased by this project, in particular, large and versatile ones, so as not preclude the performance of research and development proposals. Such purchase shall be made within control conditions of other research costs and in accordance with the equipment joint use system in the affiliated organization. The use of facilities and equipment purchased with other research funds and purchase or use with combined multiple research funds shall also be actively promoted. Note that the management of shared facilities and equipment should be balanced with their use to achieve the purposes of the research and development proposals.

Besides the above equipment joint use system, the research institutes are requested to collaborate actively with the "University Collaborative Research Facility Network Project" and with a university-wide joint use system to promote the joint use of research facilities and equipment beyond the framework of research organizations or institutes (The "University Collaborative Research Facility Network Project" is operated by the Institute for Molecular Science, National Institute of Natural Sciences, and Inter-University Research Institute Corporation to promote joint use of nation-wide facilities. The university-wide joint use system has been established at each national university as part of the maintenance project of the equipment support center).

- "About introduction of a joint use system for new research facilities and equipment integrated with research organization management"
  (Advanced Research Base Subcommittee, Council for Science, Technology, November 25, 2015)
  http://www.mext.go.jp/component/b_menu/shingi/toushin/__icsFiles/afieldfile/2016/01/21/1366216_01_1.pdf
- "About reforming competitive research expenses toward sustainable creation of research achievements (mid-term summary)"
  (Committee for reforming competitive research expenses, June 24, 2015)
  http://www.mext.go.jp/b_menu/shingi/chousa/shinkou/039/gaiyou/1359306.htm
- "About unifying the rules for the use of competitive funds"
  (Agreed upon by the coordination committees of relevant ministries and agencies on competitive funds, revised on April 20, 2017)
  https://www8.cao.go.jp/cstp/compefund/shishin3_siyouruuru.pdf
- "University Collaborative Research Facility Network Project"
  https://chem-eqnet.ims.ac.jp/

4.15 Improving the treatment of (latter-stage) doctoral students

In order to attract outstanding students and working people from home and abroad, the 3rd, 4th and 5th Science and Technology Basic Plan has set up a numerical goal of providing about 20% of the (latter-stage) doctoral students with grants equivalent to their living costs as part of an enhanced financial support for graduate students, especially for the (latter stage) doctoral students.

"Reformation of Education in Postgraduate School Leading to the Future (Deliberation Summary)" (Central Council for Education, University Division, September 15, 2015) also requests that the employment of (latter-stage) doctoral students as Research Assistants (RAs) and Teaching Assistants (TAs) should be promoted with diverse resources, and that a salary equivalent to the cost of living should be paid for RA and TA employment.

Based on the understanding of these circumstances, it is requested that the (latter-stage) doctoral students be employed as RAs and TAs and that the payment of salary equivalent to the cost of living and at an appropriate level for working hours be established for this project.

4.16 Supporting various career paths for young post-doctoral researchers

In "Basic Policy for Supporting Various Diverse Career Paths of Young Post-doctoral Researchers Employed with Public Research Funds of the Ministry of Education, Culture, Sports, Science and Technology (MEXT)" (Human Resources Committee, Council for Science, Technology, December 20, 2011) (http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu10/toushin/1317945.htm), it is requested that public research institutes employing young post-doctoral researchers with public research funds and principal investigators should actively

work for young post-doctoral researchers to secure various career paths in Japan and abroad. Based on the understanding of these circumstances, if research institutes employing post-doctoral researchers with public research funds (competitive funds, other project research funds, or public research funds for universities) after adopting their research subjects in the public invitation, they are requested to provide various supports to secure various career paths for the researchers.

The research institutes should consider utilizing the indirect costs for the efforts.

- Research institutes are requested to include action plan in their proposal to support various career paths for young post-doctoral researchers employed with public research funds (hereinafter referred to as the "career support activity plan"). The career support activity plan includes, for example, lectures conducted by the research institute in collaboration with companies, long-term internships, company exchange meetings, recommendation for participation in counseling, and recommended active participation in research activities, including in different fields. JST will check the career support activity plan at the time of selection.
- Costs required for the capacity development of young post-doctoral researchers are the fundamental costs to support research activities. Based on this concept, some of the activities of young post-doctoral researchers based on the career support activity plan set forth in the above proposal may be included in the research effort.
- In the mid-term and ex-post evaluation, research institutes are requested to report the status of the efforts made in accordance with the above-mentioned career support activity plan and the course status of young post-doctoral researchers after the end of their research period. The contents are given a positive evaluation.

  If young post-doctoral researchers participate in activities (for example, lectures conducted in collaboration with companies, long-term internship, company exchange meetings, counseling, etc.) of public research institutes (including public research institutes other than the organizations employing them) so as not to interfere with their research activities, it will be given a positive evaluation as an alternative to career support in which the principal investigators directly carries out the effort.

4.17 Security export control (to prevent technology leakage to foreign countries)

A lot of cutting-edge technologies are being researched at R&D institutes, and in particular at universities, leading-edge technologies, as well as materials and equipment used for research, are leaked due to an increase of foreign students and researchers through internationalization, which has increased the risk of these technologies being exploited for the development and manufacture of weapons of mass destruction, etc. In order for R&D institutes to carry out various research activities, including contract R&D, they are required to take systematic responses to ensure that research results that may be diverted militarily are not passed on to those who may perform these activities, such as developing of weapons of mass destruction for terrorist groups.

In Japan, exports are restricted (*) pursuant to the Foreign Exchange and Foreign Trade Act

(Act No. 228 of 1949) (hereinafter referred to as the “Foreign Exchange Law”). This, in principle, requires those who intend to export (provide) freight or technologies regulated by the Foreign Exchange Law to obtain approval from the Minister of Economy, Trade and Industry. Research institutes are required to comply with the foreign exchange law, as well as the country’s laws and regulations, guidelines and notifications. If they conduct research in violation of relevant laws and regulations or guidelines, they are subject to termination of research funding allocation or revoking of the decision on research fund allocation, besides legal dispositions and penalties.

* At present, Japan’s security export control system has two main systems based on international agreements: List Regulation and Catch-all Regulation. The List Regulation system is a system which, in principle, requires those intended to export or provide freight (or technologies) that meet specifications or functions of a certain level or higher, such as carbon fibers, numerical control machine tools, etc., to obtain approval from the Minister of Economy, Trade and Industry. The Catch-all Regulation system is a system that requires those intended to export or provide freight (or technologies) not subject to the List Regulation system which meet certain requirements, such as application, customer or notification requirements, to obtain approval from the Minister of Economy, Trade and Industry.

Not only the export of goods but also the provision of technology are also subject to the regulation of the Foreign Exchange Law. Providing technologies subject to the List Regulatory to non-residents or those in foreign countries requires prior permission. Providing technical information includes providing technical information, such as design drawings, specifications, manuals, samples and prototypes in storage media, such as paper, e-mail, CD, DVD, or USB memory and providing work knowledge through technical guidance, training or technical assistance in seminars. Acceptance of foreign students from foreign countries, and activities, such as joint research, may also involve many exchanges of technologies that may be subject to foreign exchange law.

The details of security export control are disclosed on websites, such as of the Ministry of Economy, Trade and Industry. For details, refer to the following.

- Ministry of Economy, Trade and Industry (METI):Security Export Control (general)
  http://www.meti.go.jp/policy/anpo/
- Ministry of Economy, Trade and Industry (METI):Security Export Control Handbook
  http://www.meti.go.jp/policy/anpo/seminer/shiryo/handbook.pdf
- Center for Information on Security Trade Control
  http://www.cistec.or.jp/index.html
- Ministry of Economy, Trade and Industry (METI): Guidance for the Control of Sensitive Technologies for Security Export for Academic and Research Institutions
  http://www.meti.go.jp/policy/anpo/law_document/tutatu/t07sonota/t07sonota_jishukanri03.pdf

4.18 Guidelines for Management and Audit of Public Research Funds in Research Institutes (Implementation Standards)

(1) About implementation of proper systems in accordance with the "Guidelines for Management and Audit of Public Research Funds in Research Institutes (Implementation Standards)"

The research institutes applying for this project and conducting research should comply with the contents of the "Guidelines for Management and Audit of Public Research Funds in Research Institutes (Implementation Standards)" (revised on February 18, 2014) *[1].

R&D institutes are requested to establish a system for managing and auditing research funds under their responsibility in accordance with the above-mentioned guidelines and strive for proper execution of research funds. If the Ministry of Education, Culture, Sports, Science and Technology (MEXT) finds the system implementation of a research institute inadequate as a result of investigation of the status of system implementation in accordance with the above-mentioned guidelines, JST may take measures, such as reduction in the indirect costs of all the competitive funds distributed from MEXT and the independent administrative corporations under its jurisdiction.

*1 For "Guidelines for Management and Audit of Public Research Funds in Research Institutes (Implementation Standards)," visit the following web site:

http://www.mext.go.jp/a_menu/kansa/houkoku/1343904.htm

(2) Submission of "Self-evaluation Checklist for Implementation of Proper Systems" based on "Guidelines for Management and Audit of Public Research Funds in Research Institutes (Implementation Standards)"

Before concluding an agreement for this project, each R&D institute is requested to establish a system for managing and auditing research costs in accordance with the above-mentioned guidelines, and submit Self-evaluation Checklist for Implementation of Proper Systems (hereinafter referred to as the "checklist"), and a report indicating the status of system implementation. (A research institute that fails to submit the checklist cannot conduct research.)

R&D institutes need to submit the checklist to Competitive Funding Coordination Office, Promotion Planning Division, Research Promotion Bureau, the MEXT using a form available on the website shown below by the date of concluding the contract R&D agreement via the cross-ministerial R&D Management System (e-Rad). R&D institutes that have submitted the checklist on a separate occasion after April, 2019need not submit it this time. In addition, the organizations that do not conduct research activities or those that conduct research activities but conclude (or plan to conclude) an agreement that they do not receive budgetary allocations or measures from MEXT or independent administrative corporations under its jurisdiction do not need to submit the checklist.

For details on submitting the checklist, visit the following MEXT website
http://www.mext.go.jp/a_menu/kansa/houkoku/1301688.htm

*Note: Research institutes must have their e-Rad environment available before they can submit the checklist. Please note that the registration usually takes about two

weeks. For details on the procedure for using e-Rad, visit the website below.

https://www.e-rad.go.jp/organ/index.html

The above-mentioned guidelines include a focus on “promoting the dissemination and sharing of information.” R&D institutes are requested to post this checklist on their websites, etc. to actively send information.

4.19 Guidelines for Responding to Misconduct in Research

(1) About implementation of proper systems in accordance with “Guidelines for Responding to Misconduct in Research”

R&D institutes are requested to comply with the “Guidelines for Responding to Misconduct in Research” (Adopted by the Minister of Education, Culture, Sports, Science and Technology, August 26, 2014)*1 before applying for this project and performing research activities.

If the Ministry of Education, Culture, Sports, Science and Technology (MEXT) finds the system implementation of a research institute inadequate as a result of investigation of the status of system implementation in accordance with the above-mentioned guidelines, JST may take measures, such as reduction in the indirect costs of all the competitive funds distributed from MEXT and the independent administrative corporations under its jurisdiction.

*1 For “Guidelines for Responding to Misconduct in Research,” please visit the following website:
http://www.mext.go.jp/b_menu/houdou/26/08/1351568.htm

(2) About the submission of the checklist on the status of efforts in accordance with the Before concluding an agreement for this project, each R&D institute needs to submit the checklist on the status of implementation in accordance with the “Guidelines for Responding to Misconduct in Research” (hereinafter referred to as the “Research Misconduct Checklist. (A research institute that fails to submit the checklist cannot conduct research.)

R&D institutes need to submit the Research Misconduct Checklist in a form available on the website shown below to Research Integrity Promotion Office, Human Resources Policy Division, Science, Technology and Academic Policy Bureau, the MEXT by the date of concluding the contract R&D agreement via the cross-ministerial R&D Management System (e-Rad). Research institutes that have submitted the Research Misconduct Checklist on a separate occasion after April, 2019 need not submit it this time. The organizations that do not conduct research activities or those who conduct research activities but do not receive budgetary allocations or measures from MEXT or independent administrative corporations under its jurisdiction do not need to submit the checklist.

For details on submitting the Research Misconduct Checklist, please visit the following MEXT website:

http://www.mext.go.jp/a_menu/jinzai/fusei/1374697.htm

*Note: Research institutes must have their e-Rad environment available before they can submit the checklist. Please note that the registration usually takes about two weeks. For details on the procedure for using e-Rad, visit the website below:
https://www.e-rad.go.jp/organ/index.html

(3) About measures against misconduct in research activities in accordance with the "Guidelines for Responding to Misconduct in Research"

JST will respond strictly to any misconduct found in the research activities of this project as follows:

(i) Measures to cancel the agreement

If a specific misconduct, such as fabricating, tampering or plagiarism, is found in a research and development proposal of this project, JST will cancel or change the contract R&D agreement and request for refunding of all or part of the contract R&D costs, depending on the nature of the misconduct. JST may not enter into a contract for the next and subsequent fiscal years.

(ii) Measures to restrict eligibility for application and participation

For a person involved in a specific misconduct in research papers or reports in this project or a person who is determined to have neglected the duty of care as a person responsible for the papers, reports, etc., although they cannot be determined to have been involved in the misconduct, JSL will restrict eligibility for application for or participation in this project, depending on the degree of viciousness and responsibility for the specific misconduct.

If JST takes measures to restrict eligibility for application and participation, JST provides the information to persons in charge of competitive funds distributed from MEXT and the independent administrative corporation under its jurisdiction (hereinafter referred to as "MEXT-related competitive funding programs") and to those in charge of competitive funds distributed from other ministries and agencies and the independent administrative corporation under their jurisdiction (hereinafter referred to as "other ministry-related competitive funding programs"). This may also result in restrictions on eligibility for application for and participation in MEXT and other ministry-related competitive funding programs.

<table>
<tr><th colspan="3">Applicants subject to restrictions on application due to a specific misconduct</th><th>Level of specific misconduct</th><th>Application prohibited period *</th></tr>
<tr><td rowspan="5">Persons involved in a specific misconduct</td><td colspan="2">1. Malicious person who intends to conduct a specific misconduct from the beginning of the research</td><td></td><td>10 years</td></tr>
<tr><td rowspan="3">2. Author of a paper from a research where a specific misconduct was committed</td><td rowspan="2">Author who is responsible for such a paper (Supervisor, representative author, or a person deemed to have equivalent responsibilities)</td><td>Misconduct having a major impact on the progress of research in this field or society, or considered to be highly malignant</td><td>5-7 years</td></tr>
<tr><td>Misconduct having a minor impact on the progress of research in this field or society, or considered to be less malignant</td><td>3-5 years</td></tr>
<tr><td>Author other than the above</td><td></td><td>2-3 years</td></tr>
<tr><td colspan="2">3. Any person involved in a specific misconduct excluding that set forth in 1 and 2.</td><td></td><td>2-3 years</td></tr>
<tr><td colspan="3" rowspan="2">An author who is not responsible for a specific misconduct but is responsible for papers from a research in which a specific misconduct was committed (Supervisor, representative author, or a person deemed to have equivalent responsibilities)</td><td>Misconduct having a major impact on the progress of research in this field or society, or considered to be highly malignant</td><td>2-3 years</td></tr>
<tr><td>Misconduct having a minor impact on the progress of research in this field or society, or considered to be less malignant</td><td>1-2 years</td></tr>
</table>

* Eligibility for participation is also restricted for the fiscal year in which a specific misconduct is determined as such.

(iii) Measures against researchers who have been subject to restrictions on their eligibility for application for the competitive funding programs and for basic expenses

For researchers whose eligibility for application and participation have been restricted due to a specific misconduct in research activities that receive MEXT-related competitive funds, operating costs subsidies provided to national university corporations, Inter-University Research Institute Corporation and independent administrative corporations under the jurisdiction of MEXT, private school subsidies or other basic expenses, or other ministry-related competitive funds, JST will restrict eligibility for application and participation in the project.

(iv) Publication of misconduct case

If a researcher committed misconduct in the research activities in this project, JST will publish the outline (researcher name, project name, affiliated organization, fiscal year of research, description of misconduct, and description of measures that have been taken) of the misconduct case. The description of misconduct case (name, type, research field and outline of misconduct case, name of expenses involved in misconduct, measures that were taken by a R&D institute and by funding agency) are also, in principle, published by the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

The above-mentioned guidelines state that if it is determined that misconduct has been found, R&D institutes shall publish the results of investigation promptly. The research institutes are requested to respond properly.

http://www.mext.go.jp/a_menu/jinzai/fusei/1360483.htm

4.20 Mandatory education on research integrity and compliance

Researchers who are to participate in a R&D project for this project shall receive education on research integrity to prevent misconducts in research activities, as requested in "Guidelines for Responding to Misconduct in Research," and on compliance, as requested in the "Guidelines for Management and Audit of Public Research Funds in R&D institutes."

During the conclusion of a contract R&D agreement after adopting a research and development proposal, the principal investigator must submit a document that confirms that all researchers who are to participate in the R&D project for this project have received education on research integrity and compliance, and have understood the contents.

4.21 Handling of information, such as research subjects, on e-Rad

JST handles the information related to each adopted research subject on e-Rad (project name, title of research and development proposal, name of affiliated R&D institute, name of principal investigator, amounts of budget, implementation period, and outline of research subject) as the information to be released as set forth in Article 5, item (i) (a) of "Act on Disclosure of Information Held by Independent Administrative Corporations" (Act No. 140 of 2001). After adopting a research subject, JST will publish this information on the website of the project, as appropriate.

4.22 Providing information to the Cabinet Office through e-Rad

In order to promote science and technology innovation policies based on objective grounds, the 5th Science and Technology Basic Plan (Cabinet Decision of January, 2016) requires a thorough registration of public funds in the cross-ministerial R&D Management System (e-Rad) to facilitate evaluation and analysis. The information registered in e-Rad is used to evaluate the nationally funded R&D properly and plan effective and efficient comprehensive strategies, resource allocation policies, etc. Based on the information registered in e-Rad, CSTI and related ministries and agencies associate the output and outcome information with input to the publicly funded research program. To this end, a thorough registration of outcome

information, such as papers, patents, and accounting performance, is called for.

It is also requested to enter information on the research results, accounting performance and the execution performance of indirect costs for the competitive funds for an adopted research subject for each fiscal year in e-Rad.

This provides the Cabinet Office with the information necessary for macroeconomic analysis, such as information on the research results, accounting performance.

4.23 Registering researcher information to researchmap

researchmap (https://researchmap.jp/) is the largest researcher information database in Japan in the form of a comprehensive list of Japanese researchers, and the registered performance information can be published through the Internet. The researchmap is also linked to e-Rad and the faculty databases of many universities to allow the registered information to be used by other systems as well. This eliminates the needs for researchers to repeatedly register the same performance in various applications and databases.

The information registered in the researchmap is also effectively used for investigation for planning of national scientific and technological policies and for statistical utilization. Researchers are requested to register information to researchmap.

4.24 Patent application by JST

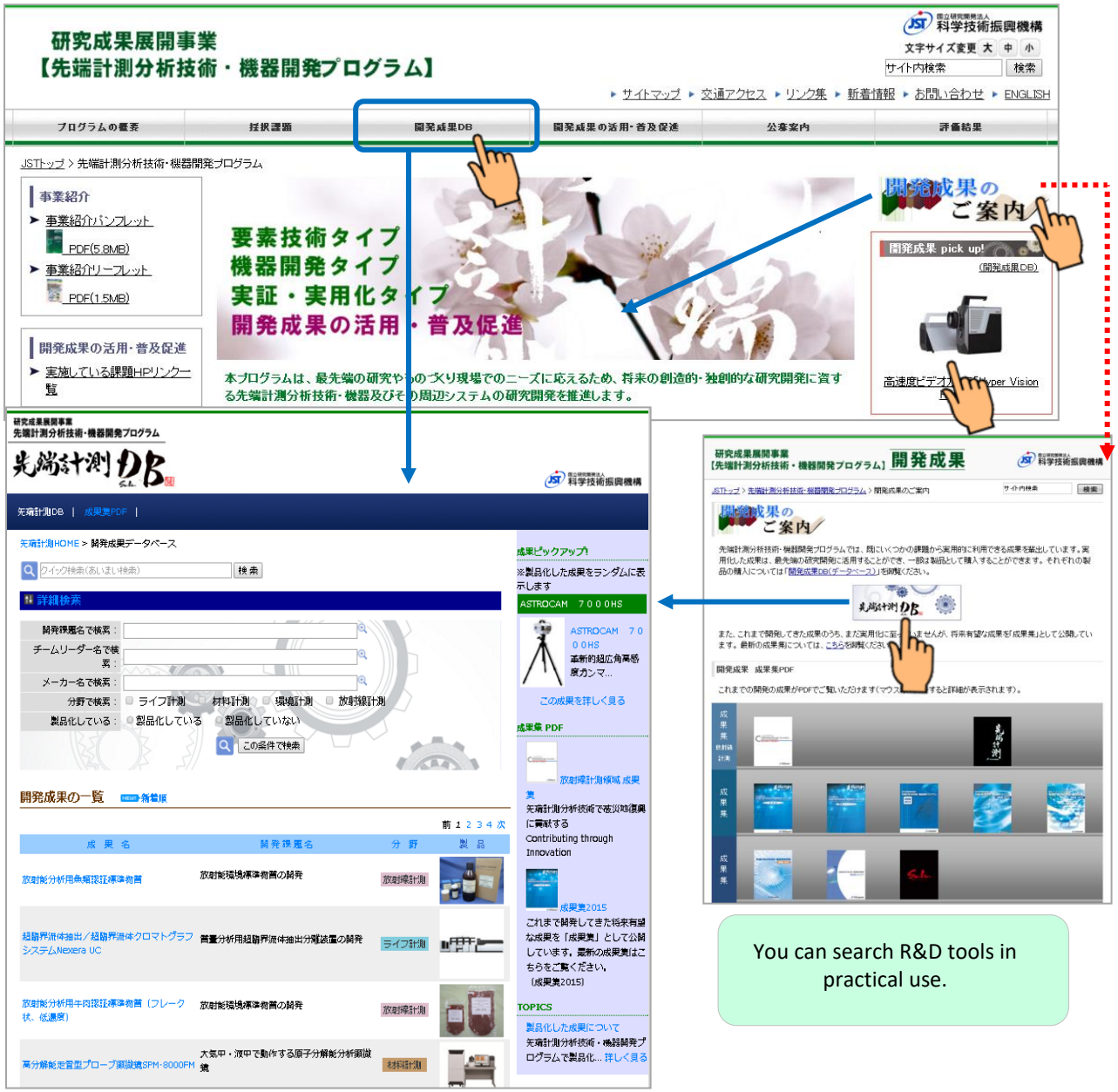
If an R&D institute does not acquire any rights for an invention, JST may acquire the rights. If the R&D institute does not intend to acquire rights for the invention, the researcher should convey the information on the invention promptly to JST in any format. (The above “information on the relevant invention” refers to the information required for JST to determine the applicability for patent, such as a copy of the internal notification of the invention used in the R&D institute.)

JST conducts a review based on the information that has been received. If JST determines that it can make a patent application for the invention, the R&D institute and JST will separately conclude an agreement for transferring the patent right.

4.25 Research achievement of JST-SENTAN (Development of Advanced Measurement and Analysis Systems) Program

- ◯ JST has implemented various R&D systems, ranging from basic research to industry-academia collaboration, putting a number of our R&D achievements into practical use.
- ◯ Among them, many R&D tools have been put into practical use in the JST-SENTAN (Development of Advanced Measurement and Analysis Systems) Program, with an aim to establish and develop R&D infrastructure (R&D platform).
- ◯ If you need a new R&D tool to conduct your R&D, please refer to our tools.

For details, visit our website at https://www.jst.go.jp/sentan/.



4.26 Human right protection and legal compliance

If your research idea includes research that requires procedures based on laws and regulations, and research that requires the consent and cooperation of the other party or consideration on personal information, or treatment of Bioethics and bio-safety, be sure to take necessary procedures, such as obtaining approval from the ethics committee other than the R&D institute. In addition, when you conduct a research activity abroad or a joint R&D with an overseas R&D institute be sure to check the laws and regulations in the relevant country in advance, and comply them.

Especially, for R&D in Life Sciences field, some laws and regulations provided by ministries and agencies may be revised. So, be sure to check the latest version. If you conduct a research in violation of relevant laws and regulations as well as guidelines, it may result in the suspension of an R&D budget allocation, and rescission of adoption in the R&D budgets.

For more information on MEXT's policies for ensuring Bioethics and bio-safety, visit the website below.

- R&D in Life Sciences Field "Measures for Bioethics and Bio-safety"

  http://www.lifescience.mext.go.jp/bioethics/index.html

If your R&D plan includes research or survey that requires the consent and cooperation of other party or social consensus, be sure to take appropriate action prior to the application regarding how to deal with the protection of human rights and interests.

Chapter 5
Submission via the Cross-ministerial R&D Management System (e-Rad)

5.1 Cross-ministerial R&D Management System (e-Rad)

The cross-ministerial R&D Management System (e-Rad) is a cross-ministerial system that provides a series of on-line processes to manage the publicly funded research projects under the jurisdiction of ministries and agencies (Acceptance of applications → Selection → Adoption → Management of adopted subject → Registration of research results and accounting performance).

* The "e-Rad" is the abbreviation of the cross-ministerial R&D Management System, which is created by adding the capital letter of "e" of "Electric" to the capital letters of "Research and Development" for science and technology.

5.2 Application method using e-Rad

R&D institutes are requested to make an application using e-Rad.

For the application flow, refer to the flowchart as follows.

(1) Pre-registration for using e-Rad

R&D institutes and researchers must be pre-registered before e-Rad can be used.

① Registration of R&D institute

An R&D institute needs to be registered to e-Rad by the time of application. An R&D institute is requested to appoint one administrative representative in charge of the e-Rad who download the form of R&D institute registration from the e-Rad portal site (hereinafter referred to as the "portal site") to apply for registration. (In case of a researcher who belongs to an R&D institute outside Japan or does not belong to any R&D institute, the researcher himself/herself shall apply.) Since registration takes several days, the research institute should perform the registration procedure more than two weeks before. Once the registration is completed, the research institute needs not to register the information again when applying for a program or project under the jurisdiction of other ministries or agencies. Similarly, if the research institute has already registered its information in a program or project under the jurisdiction of other ministry or agency, it need not register its information again.

② Registration of researcher

The R&D institute must register information on researchers who conduct R&D, and issue a log-in ID and a password.

For how to register researcher information, refer to the manuals, posted on the portal site, for the administrative representative of the R&D institute and for persons in charge of administrative work.

(2) Application using e-Rad application

For application using e-Rad application by researchers, refer to researchers' manual posted on the portal site (https://www.e-rad.go.jp/manual/for_researcher.html). Apply after agreeing to the terms of use.

(3) Preparing for R&D proposal

- Be sure to check Application Guideline carefully to prepare the R&D proposal.

<Note>

① When you login the e-Rad, please check its recommended operating environment; IE, Firefox, Chrome, and Safari.

② Application requires entry of information on the website along with an application form (R&D proposal). Download the Application Guideline and R&D proposal formats at the website below (https://www.jst.go.jp/mirai/jp/open-call/research/r01/)

The application form that can be uploaded is a single file having the maximum capacity of 3 MB. If you include image data in the file, be careful of the file size.

③ The created application form file must be uploaded in PDF format.
Note the following points when using PDF format.

・Delete all the markups before converting your file to PDF.

・Do not set up a password for the PDF on the R&D proposal.

・Confirm that the converted PDF files have been paginated.

・Be sure to review the converted PDF file as it may get gibberish by page or file.

* You can convert your file to PDF format at the menu page after logging in e-Rad.

④ An application whose status is not changed to “Under Process of Funding Agency” or “Accepted” will be invalidated by the submission deadline. Confirm the application status on the “Subject List” screen.

(4) Other

An incomplete application form will not be subject to selection. Be sure to read “Application Guideline” and “Procedure for Preparing Proposal Forms” and then fill out the form carefully (Do not change the format of the application form). JST does not accept a request to replace or return the application form.

5.3 Others

(1) Where to direct questions on how to use the e-Rad system

Questions about the project itself are answered by a person in charge of project, just as usual. Questions about e-Rad operation methods are answered by e-Rad Help Desk.

Before asking questions, be sure to read the website for public invitation for this project and e-Rad Portal site carefully. **JST will not answer any questions regarding the status of the examination or acceptance.**

Questions about projects and procedures for preparing and submitting application documents	Department of R&D for Future Creation, JST	<We accept an inquiry e-mail only (excluding emergency cases)> E-mail: kaikaku_mirai@jst.go.jp Phone: 03-6272-4004 Business hours: 10:00-17:00 * Excluding Saturday, Sunday, public holidays and New Year holidays [We may ask you to contact us by e-mail even though you contact us by phone.]
Questions about e-Rad operation methods	e-Rad Help Desk	0570-066-877 (9:00～18:00) * Excluding Saturday, Sunday, public holidays and New Year holidays

○ Department of R&D for Future Creation's website: https://www.jst.go.jp/mirai/jp/open-call/research/r01/

○ e-Rad portal site：https://www.e-rad.go.jp/

(3) Availability of e-Rad

As a rule, e-Rad operates 24 hours a day 365 days a year, but JST may stop the service for system maintenance. If JST decides to do so, it will be preliminarily notified on the portal site.

Chapter 6
Prioritized Theme and Technology Theme for Research Proposals

6.1 Small-start type

For Small-start type, JST sets Prioritized Themes for proposals based on research areas (sections) selected by the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

6.2 Large-scale type

The Technology Theme of Large-scale type that is believed to be important for forming the bases of future technologies, has been determined by The MEXT based on the information analysis on science and technology innovations.

For more details on Prioritized Theme and Technology Theme for research proposals in 2019, see Appendix Application Guideline, Chapter 6 "Prioritized Theme and Technology Theme for Research Proposals":

https://www.jst.go.jp/mirai/jp/uploads/application-guideline-r01-c6.pdf

Please make sure to visit our Call for R&D Proposals page for the latest updates:
https://www.jst.go.jp/mirai/jp/open-call/research/r01/

【Contact for Inquiries】
Please submit inquiries by email (except for urgent inquiries).

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* Except Saturdays, Sundays, and National Holidays

[Communication by e-mail may be requested even when a question is asked by telephone.]