Explanatory Meeting

Overview of the Moonshot R&D program and the call for proposals

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Japan Science and Technology Agency

Department of Moonshot Research and Development Program

Japan Science and Technology Agency



Agenda

- 1. Overview of the Moonshot R&D (p. 3~p.16)
- 2. Call for Proposals (p.17~p.25)
- 3. R&D after the adoption (p.26~p.29)
- 4. Precautions (p.30~p.39)



- O Many original research results have been created from the basic research field in Japan that holds the possibility of future industrial and social transformation.
- O However, the research and development system for implementing these research results in the industries and society speedily and internationally has not been completed yet.



※1: Funding Program for World-Leading Innovative R&D on Science and Technology (FY2009~FY2013)
 ※2: Impulsing Paradigm Change through Disruptive Technologies Program (FY2013~FY2018)

Overview Moor

- O The Moonshot Research and Development (R&D) Program aims to solve various difficult issues in today's society, such as the declining birthrate, aging population, large-scale natural disasters, global warming and many others. Japan will promote international R&D cooperation to solve these issues.
- By aggressively promoting challenging R&D rather than improving conventional technologies, the Cabinet Office of Japanese Government and other relevant ministries will facilitate disruptive innovation through enhancing researchers' trials and errors.

< Features of the Moonshot R&D Program >

- 1. Set ambitious targets that attract people and researchers all over the world
 - \rightarrow Create innovation through international collaborations!
- 2. Promote innovative R&D through accepting errors and maximizing the basic research capabilities
 - → Create innovation from basic research and positive feedbacks that attract new basic research investments!
- 3. Innovate research management methods, establish the newest research support system, and implement open and closed strategies

→ Adopt world trends and establish challenging and speedy research management systems!

Under the CSTI as the control tower, MEXT, METI, JST and NEDO promote R&D together.

For Example,





Defend against cyberterrorism



Expand social participation in old age



Promotion System

Overview





Overview Setting the Moonshot Goals

• Visionary Council (31/7/2019)

Indication of Areas, Visions, Examples of the Moonshot goals

https://www.kantei.go.jp/jp/singi/moonshot/dai4/gijisidai.html

Moonshot International Symposium (17/12/2019-18/12/2019)

Discussion on the Moonshot goal candidates

https://www.jst.go.jp/moonshot/sympo/sympo2019/index_e.html

• The Council for the Science, Technology, and Innovation (CSTI)

Determination of the Moonshot Goals (23/1/2020)

https://www8.cao.go.jp/cstp/stmain/20200123moonshot.html





Overview

Moonshot Goals



※ Call for Proposals of Moonshot R&D regarding the Moonshot Goal (4), please refer to the following website of NEDO. https://www.nedo.go.jp/english/ZZCA_100012.html

Hierarchical structure for the Moonshot R&D program

Overview

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Overview

Management Structure for MS program in JST

Overview

Program Directors (PDs)

	Moonshot Goal	Program Director(PD)
1.	Realization of a society in which human beings can be free from limitations of body, brain, space, and time by 2050.	Prof. HAGITA Norihiro (Chair and Professor, Art Science Department, Osaka University of Arts)
2.	Realization of ultra-early disease prediction and intervention by 2050.	Prof. SOBUE Gen (Chairperson, Aichi Medical University)
3.	Realization of AI robots that autonomously learn, adapt to their environment, evolve in intelligence and act alongside human beings, by 2050.	Prof. FUKUDA Toshio (Professor, Graduate School of Science and Technology, Meijo University)
6.	Realization of a fault-tolerant universal quantum computer that will revolutionize economy, industry, and security by 2050.	Prof. KITAGAWA Masahiro (Professor, Graduate School of Engineering Science, Osaka University)

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Program Director(PD)'s Duties

Realize the concept and achieve the MS Goals, strategically build a draft of portfolio*, and promote R&D in a challenging and systematic way. *the management plan that summarizes the project components(combination) and resource allocation, etc.

When building a draft of portfolio, in principle, combine multiple projects that take different research approaches.

Overview

Always understand the progress of R&D based on the portfolio, and manage and supervise in an unified manner the PMs who oversee the relevant projects while constantly reviewing the portfolio, such as allocating resources with a focus on research that is steadily progressing, and discontinuing a project if it is deemed to be unlikely to produce results.

Project Manager(PM)'s Duties

□ Under the direction of the PD, refine a proposed project during an open call to improve it, draw up a project plan:

✓ target setting of project

Overview

- \checkmark preparation of R&D details and implementation schedule
- \checkmark establishment of an R&D system to implement the project
- ✓ formulation of a plan to allocate research funding to participating R&D institutions in the project etc.

Strategically implement the project

□ Flexibly and nimbly implement project modifications and changes in

direction, including practical use of some research results in society

Overview PM Activities

The PMs take management on their own through the following PM activities and carry the responsibility for the R&D projects in general for the achievement of the MS Goals and the realization of the R&D concepts.

[Major PM Activities]

- The PMs collate the relevant knowledge from different researchers—top runner, young, and senior—in and outside Japan and formulate the scenario to achieve the MS Goals through backcasting—achieving the Goals
- Designing ambitious R&D projects that are more than just extensions of conventional technologies
- Building Research and Development Organizations (including selection of performers)
- Implementing and Undertaking the Management of R&D projects

(To flexibly conduct reviews to alter the orientation, including the acceleration or deceleration of R&D items conducted by each performer)

- Publication and outreach activities based on the results of R&D projects
- Ensuring management of the various assignments

Overview PM's Institution

A PM's Institution, based on its contract with JST, organizes an environment in which the PM activities can be performed effectively and efficiently, hires personnel to support the PM, and constructs organizational infrastructure, thereby providing various types of support to the PMs' activities, including managing the progress of the R&D projects undertaken by the performer, who works for the PM's Institution or any other organization, and supporting the PM activities. In addition, a PM's Institution should manage the cross-organizational support provided to PM activities with the front-runner support function of Moonshot R&D, in addition to direct support for PM activities.

• Organizing a System to Support PM Activities

(including hiring and undertaking the management of the work done by personnel supporting the PM activities from the PM's Institution)

[PM Activities to support]

① Designing R&D projects (including selection of performers)

- Implementing and Undertaking the Management of R&D projects (including reviews to alter the orientation of R&D items conducted by each performer)
- ③ Cooperation with JST (including agreement on the regulations governing implementation overseen by R&D institute and JST, and contracting businesses)
- ④ Publication and outreach activities based on the results of R&D projects, and the like

Performers: selected by PM in refining period after project is adopted

The performers implement the contents of the assignments for the research and development in the R&D project as instructed by the PM, to achieve the MS Goals and embody the R&D concepts. JST concludes R&D agreements with the R&D institutions of performers and pays for the costs of R&D.

(Note) Selection of performers by the PM

The <u>PM builds a virtual R&D organizations by selecting performers through</u> <u>methods such as designation, public invitation.</u> The composition of the R&D institutions is determined during the refining period; however, depending on the progress status, changes in external environments, performers may be added and/or switched even during the period in which the R&D projects are executed.

In the application forms please specify a major performer candidate, who is essential for implementing the R&D project.

Overview

R&D Organizations

Application Schedule

Call for

Proposals

Application Deadline

12/5/2020, noon_(Japan Standard Time)

(Research proposal acceptance via e-Rad begins: 10/3/2020)

Please understand that applications made after the deadline will not be accepted under any circumstance.

Invitation to interview-based review	Mid-June – Late June
Period of interview-based review	Late-June – Early-July
Notification and announcement of selection results	Early or Mid-July

The dates for the interview-based review will be announced later.

Applicants need to satisfy <u>ALL</u> application requirements (1 to 5) as listed below. The requirements need to be maintained during the period of the execution of the R&D projects.

- 1. Applications must be filed by one person, not by a group.
- 2. As much effort as possible must be made to monitor and manage PMs' activities. (%)

(%) However, if the PD decides that it is extremely effective for the PM to perform part of the research and development of an R&D project on his or her own to achieve a particular objective, he or she may participate in R&D as a performer.

3. All responsibilities of the R&D project must be undertaken for all periods of the R&D project's implementation.

Application Requirements (PM candidate)

- 4. A program regarding research and ethics education has been completed at the institution to which he or she belongs. Alternatively, an education program provided by JST must be completed by the application deadline.
- 5. A pledge must be made regarding the following four items. The applicant must:

• Understand and be willing to conform to the "Guidelines for Responding to Misconduct in Research Activities" (decision, Minister of Education, Culture, Sports, Science and Technology, August 26, 2014)

• Understand and be willing to conform to "Guidelines for the Management and Audit of Public Research Funds In Research Institutions (practice standards)" (revised on February 18, 2014)

• Not have committed any misconduct in research and development activities (forgery, falsification, and theft) or any unjustifiable use of entrusted research funds

 Not have committed any misconduct in research and development activities with respect to the past achievements of the research and development described in the applicable written proposal *The pledges are available from the screen to fill in the information of applicants on the Cross-ministerial R&D Management System (e-Rad).

Application Requirements (R&D Project)

Before making an application, the applicants must understand that items 1 to 3 below must be satisfied for the R&D project they propose.

1. Compatibility with the Project Aims

To contribute to the resolution of social problems and have a significant impact on industry and/or society, as well as to introduce a challenge based on a bold concept towards achieving the MS Goals

2. Scenarios Leading to the Achievement of MS Goals

- ✓ As a scenario that is addressed in a R&D project, that is grasped not only from technological viewpoints but also from a broad perspective, including social viewpoints
- \checkmark The problems that should be overcome are analyzed and identified.
- ✓ To resolve problems that should be overcome, the methods and/or means are presented based on scientific proof.

Note: Describe in the application forms, what accomplishments are produced for each step at the time when the R&D project you propose accomplishes the "milestones in the third year, the fifth year, and the tenth year from the adoption as a PM," in addition, describe what ripple effects (impact) will be brought to the academe, industries, or society.

3. Plans for Constructing a Research and Development Organization

The measures and plans for constructing an organization that further develops the ability to conduct R&D projects at the highest level, regardless of its location within or outside of Japan, not limited to a specific research community, and leveraging knowledge from a wide range of fields to solve problems

1. The Periods to Implement R&D projects

- The period to implement R&D projects is five years from the adoption of the PM.
- A period of the execution of the evaluation is supposed to be, besides the third year, in the fifth year after the timing of the adoption of the PMs and, in addition, the evaluation is performed whenever the PDs recognize it necessary to do so. In either case, the R&D project may be altered (accelerated, decelerated) or terminated.
- The maximum period is ten years if it is decided to continue beyond the five-year period.

2. The Monetary Amount for R&D projects

Based on the content of proposal, the applicant can make the budget of R&D project the most appropriate amount that he or she estimates at the time of the proposal.

The R&D budget for a R&D project at the initial stage will be judged and determined by the PD in cooperation with the advisors etc. as external experts at the time of refining after adoption.

Call for Application Requirements Proposals (PM's Institution)

- An applicant, even if it is unclear whether the organization to which the applicant belongs will be his or her PM's Institution, is allowed to make an application.
- However, an applicant must determine their PM's Institution by the close of the refining stage.
- The adoption will be canceled if the PM's Institution is not determined within, in principle, three months(*) following the adoption of the project.(*: If PM does not choose the present institution as the PM's Institution, the deadline will be until end of fiscal year that PM is adopted.)

Application Requirements (PM's Institution)

Before making an application, the applicants must fully understand that items 1. and 2. below must be satisfied by the PM's Institution.

- 1. To be an employer of the PM, which is a university, college, public organization, private enterprise, or the like, that is a Japanese corporation and has a base of activities in Japan, and to employ the PM by the end of the refining period
- To accept the items described in section 4.1.2*, "The Roles and Responsibilities of PM's Institutions" and to finalize a contract with JST

*A PM's Institution, based on its contract with JST, organizes an environment in which the PM activities can be performed effectively and efficiently, hires personnel to support the PM, and constructs organizational infrastructure, thereby providing various types of support to the PMs' activities, including managing the progress of the R&D projects undertaken by the performer, who works for the PM's Institution or any other organization, and supporting the PM activities. Specifically, it supports the activities in section 4.1.1,"The Roles and Responsibilities of the PMs." In addition, a PM's Institution should manage the cross-organizational support provided to PM activities with the front-runner support function of Moonshot R&D, in addition to direct support for PM activities.

Viewpoints in Selection

Our selection will be based on the following viewpoints and made in a comprehensive manner.

1Nature as a PM

- OTo have a wide human network of relevant researchers within and outside of Japan and to possess specialized knowledge
- OTo have the ability for management to construct an optimum R&D institution and review the organization proactively, depending on the status of the progress (including those in relation to the management and usage of research data) and to have leadership ability

2R&D projects Proposed by PMs

- O The target and/or the contents of the project proposed by the PM (referred to as "proposal contents" from here) must be based on a bolder idea than conventional ones and be a challenging one and must be a innovative one with which a strong impact is expected in the future industry and/or society.
- O The proposal contents must be able to clearly explain the adequate scenario (the hypothesis of the success) from the viewpoint of social implementation including the viewpoint of technology and the assignments of the roles to governmental bodies and private sectors for the achievement of the goal in 2050.
- The proposal contents must entail collecting the knowledge of researches and developments and ideas at a high level, regardless of their geographical location within or outside of the country. or the like.

Schedule of the R&D Project

[Period of R&D Project]

R&D

after the

adoption

- The period of R&D project is 5 years, in principle. If the expansion of project over 5 years, the duration will be 10 years at maximum.
- The project will be evaluated in 3rd year. In addition, the project will be evaluated in 5th year and when PD needs to do. The project may be changed(increased/decreased) or finished according to its result.

R&D after the adoption

Refining the R&D Project

-Reviewing and Embodying the Contents of the R&D project

The PMs, whose refining is recognized as appropriate by the PDs are allowed to execute the R&D project based on a determination of the refining appropriateness.

R&D after the adoption

Refining the R&D Project -Supporting PM activities

The adoption will be canceled if a PM's Institution is not determined within, in principle, three months(*) following the adoption of the project.(*: If PM does not choose the present institution as the PM's Institution, the deadline will be until end of fiscal year that PM is adopted.)

Constructing a System to Support PM Activities

ODetermining a PM's Institution

 $\bigcirc \mathsf{Proposing}$ plans to structure the organization to support PM activities

OConstructing an organizational infrastructure to ensure the support

necessary at the beginning of the R&D project and organizing an appropriate environment

Other

 Making arrangements for and organizing implementation regulations to define items that should be observed by participants in the R&D project
 Moving the base of activities quickly into this country (if the base of activities is outside the country at the time of the adoption)

R&D after adoption Contract and agreements required to start the R&D project

- □ For the start of an R&D project, JST makes, in principle, a contract for entrustment of the R&D with the PM's Institution, and the R&D institution, separately.
- □ The PM's Institution, R&D institutions, and JST prepare regulations for intellectual property, the handling of secrecy, and other operational rules for the R&D project. The institutions should make a pledge.

Precautions ①R&D Concepts

Call for proposals is hold for each Moonshot goal. Please make sure to see the following contents.

Moonshot Goals
R&D Concepts and PDs' Supplements

For More Details: (Japanese) <u>https://www.jst.go.jp/moonshot/koubo/</u> (English) <u>https://www.jst.go.jp/moonshot/en/application/</u>

Precautions 2 How to apply

Applications are received via e-Rad, the cross-ministerial R&D management system.

Please see the following URL for how to register : https://www.e-rad.go.jp/en/researcher/index.html

Please understand that applications made after the deadline will not be accepted under any circumstance.

Note that an application cannot be accepted if the proposal is withdrawn after the application deadline.

Precautions

③Conflict of Interest

To ensure a fair and transparent evaluation, parties with interest that are listed below will not participate in the selection processes regarding relevant applicants.

- a. A person or persons who is or are related to the applicant
- b. A person or persons who belongs or belong to the same department, major, etc. within a university, college, or research and development organization at a national research and development corporation or to the same enterprise as the applicant
- c. A person or persons who engages or engage in a close joint R&D project with the applicant or a person or persons who has or have participated in a close joint R&D project within the past five years (this refers to, for instance, conducting a joint project, authoring a research paper as coauthors, the members of an R&D project for the same purpose, or the joint researchers or the like of any other R&D project of the applicant, who practically belong to the same research and development group as the applicant)
- d. A person or persons who has or have been closely related to the applicant as a teacher or a student or who has or have been in a direct employer-employee relationship for a total of ten years previously
- e. A person or persons who is or are in an academically competitive relationship with the applicant's R&D project or who belongs or belong to an enterprise that is in a competitive relationship in the market
- f. Any other person or persons who is or are judged by JST to be a party with interest

Precautions

4 Taking a course on research ethics

- To apply to this program, applicants need to have completed a course on research and ethics education by the application deadline.
- Note that if we cannot confirm their finishing the course, we will regard their applications as not having satisfied the requirements.

The flowchart for completing a course on research ethics and declaring the completion of a course

*Condensed version of the eAPRIN (formerly CITI Japan) e-learning Program, please see also: https://edu2.aprin.or.jp/ard/

Precautions 5 Restrictions on Multiple Applications

Restrictions on Applications

- No one applicant is allowed to make applications of two or more R&D projects for the same MS Goal.
- No one applicant is allowed to make applications of an R&D project for two or more MS Goals
- In the case in which you plan to participate, as a PM or a performer, in the proposal for two R&D projects or more and two or more of the R&D projects are adopted*, we may make adjustment, depending on the judgment of a PD, after considering the contents, the scale, etc. of the R&D, for the reduction of the R&D cost and for not allowing the participations in some problems among the R&D project in which the applicable researcher participate.
 - * See the following examples:

Adopted Proposal 1	[PM] Mr./Ms. X [Performer] Mr./Ms.Y
Adopted Proposal 2	[PM] Mr./Ms. Y [Performer] Mr./Ms.X

Adopted Proposal 1 [PM] Mr./Ms. X [Performer] Mr./Ms.Y, Mr./Ms.Z Adopted Proposal 2 [PM] Mr./Ms. W [Performer] Mr./Ms.Y, Mr./Ms.Z

Precautions

6Research Facilities and Equipment

- It is desirable that universities, colleges, national research and development agencies, and the like use "a system to share research facility/equipment by the unit of a research organization(referred to as "equipment sharing system" from here) ".
- R&D institutions must endeavor to share the particularly large and general-purposeperformance research facility/equipment purchased for this program as long as it is within the scope of research and does not present obstacles to applicable research projects
- This applies to research facility/equipment purchased with other research funds and for purchasing/sharing them; a total of two or more research funds based on what is stated above within the scope of the management conditions of other research funds.
- In the R&D project proposal form (Form 5), the description on the major facility to be purchased (20 million yen or higher per one, the name of the equipment, a rough estimation of the expenditure) is needed; after the adoption is determined, in the course of refining of the R&D project by the PM, the plans for the purchase, operation, sharing of the applicable facility should be brushed up.
- In addition, from the viewpoint of the effective and efficient implementation of each R&D project implemented in this program, some arrangements may be made for the facility to be purchased with the direction of the PD in cooperation with external experts as advisors etc.

Precautions

⑦Human Rights Protection and the Management of the Observance of Laws

- If a research project needs to include life ethics and/or safety measures, then it must acquire approval from the ethics committees in and outside the R&D institution and/or follow necessary procedures.
 - Necessity of an agreement about cooperation with an opponent
 - Consideration of the handling of personal information
 - Inclusion of life ethics and/or safety measures etc.
- The laws and ordinances in the relevant countries must be observed when a research activity overseas and/or a joint R&D project with an overseas R&D institution is performed.

Precautions Supplement 1 Restriction due to an unjustifiable R&D fund use

Measures for Researchers Whose Applications and Qualifications for Participation Are Restricted in Other Competitive Funds

The researchers who are restricted due to an unjustifiable use of research funds, in other competitive funds* under management of a national governmental body or an incorporated administrative agency, are restricted from making an application or qualifying to participate in this program during the period in which they are restricted from qualification and application in other competitive funds. "Other competitive funds" include those that start new calls in the fiscal year 2020 or later. The systems that were terminated in the fiscal year 2019 or earlier are also included.

*For the specific systems currently within the scope, access the following website: <u>https://www8.cao.go.jp/cstp/compefund/</u>

(Competitive funds) The research funds that use calls for proposals will be published in the coming days.

Precautions Supplement 2 Data Management

Researchers who have participated in Moonshot Research and Development will be obliged to manage and use research data as R&D results, based on "Guidelines for Operation and Evaluation of the Moonshot R&D Program", "JST's basic policies for handling research achievements toward an open science promotion", and Open-Close strategies.

The organizations (PM's Institutions) that the project managers (PM) adopted for the project are obliged to create and submit a data management plan to document their principles and plans regarding the retainment, management, disclosure, and nondisclosure of the research data that will be produced; thus, the organizations will follow their plans to retain, manage, and disclose their data pertaining to research and development.

Please see also the below website of the Cabinet Office for a related discussion. <u>https://www8.cao.go.jp/cstp/tyousakai/kokusaiopen/</u>

Precautions Details on the call for proposals

• For more details on the call for proposals:

https://www.jst.go.jp/moonshot/en/application/

Dates of interview-based reviewing will be announced via the above webpage.

• Inquiries about the call for proposals

E-mail:moonshot-koubo@jst.go.jp

