# R&D proposal “Large-scale type” called for in FY2020 (Form 1)

Confidentiality class2

|  |  |
| --- | --- |
| Technology Theme | Innovative device technologies to achieve ultra-high level information processing in the age of trillion sensors (TSensors)  |
| Title of R&D project*\* about 20 words* |  |
| R&D period | Whole period: November, 2020-month, year ( years) |
| R&D budget(Direct Costs)*\* (1) = (2) + (3)**Omit decimal point* | (1) Total R&D costs desired for the whole period (　　　　million yen) |
| (2) Total R&D costs desired for 1st to 4th year(　　　　million yen) |
| (3) Total R&D costs desired for 5th year and after (　　　　million yen) |
| Estimated fund from a sponsoring organization\* | Total amount for year fiscal - year fiscal (　　million yen) |
|  | *\*Be sure to see the Application Guideline, Chapter 3, “3.4.2 Evaluation in large-scale type.”* |
| Name of R&D Principal Investigator (PM) |  |
| AffiliatedInstitution, Department, Title |  |
| Conflicts of interests with R&D supervisor*\* Check* | Conflicts of interests with R&D supervisor: Yes □ No □*\* If “Yes,” describe contents in Form 3 “7. Other.”* |
| Conflicts of interest with R&D proposer, etc.*\* Check* | Participation of R&D proposer-related organizations: Yes □ No*\* If “Yes,” describe contents in Form 3 “7. Other.” For details, Check “(2) Managing the conflicts of interest” in the Application Guideline Chapter 2, “2.3.3 Selection method.”* |
| Researcher number | *\*Enter the 8-digit “e-Rad” login ID number which is allocated by the Cross-ministerial Research and Development Management System (e-Rad)* |
| Information on R&D Principal Investigator (PM) | URL: Author ID: *\* URL if website (lab website, researchmap page) available for information on the Program Manager, or ID if ORCHID ID, Researcher ID, or SCOPUS author ID is known* |

# R&D Project Description (Form 2)

\* Be sure to check the policies of the R&D supervisors for each area, which are described in the Application Guideline, Chapter 2, “2.2.2 (5), Selection viewpoints” and “Appendix Application Guideline, Chapter 6 “Prioritized Theme and Technology Theme for Research Proposals.”

# 1. Goal to be achieved by this R&D project

\* The goal is to reach a stage (proof of concept: POC) where application feasibility may be judged.

# 2. Reasons for setting the goal

# 2-1 Scientific viewpoint

\* Provide simple and clear descriptions in line with the following:

- Verification of the validity of the goal in line with the current R&D status.

- Reasons and problems why the goal is not achieved at present, and propose R&D effective for finding solutions.

# 2-2 Viewpoint of social and industrial needs

\* Take into account the following when describing why you set a particular goal:

- Show the ground of setting a highly impactful goal based on social and industrial needs.

- Show the path to social implementation after achieving the POC and social and economic impacts that are believed to exert both in Japan and overseas.

\* Prepare a separate compact summary of the contents of “1. Goal to be achieved by this R&D project” and “2. Reasons for setting the goal” in about 300 words in English, and include this summary in the “research objective” section of “Basic information” on e-Rad.

**- Do not exceed two A4-size sheets (no exceptions) -**

R&D Plan of Full-scale Research (Form 3)

# 1. Matters to be achieved by this R&D project

\* Clearly describe, in about 300 words in English, matters to be achieved during this R&D project.

\* Copy this description and paste it into the “research outline” section of “Basic information” on e-Rad.

# 2. Contents of this R&D project

(Items of entry)

・R&D plan (implementation scheme, budget, milestone, etc.)

・Issues on social implementation (e.g. consideration of ELSI) and solutions

・Understanding of social and industrial needs and how to involve private companies

・R&D results deployment scenario (business model, transfer to companies, etc.)

\* Describe the following about the proposal as clear as possible:

・R&D aiming for a breakthrough of science and technology, not extension of conventional technology

・Proposal with competitiveness and originality in line with R&D trends in Japan and abroad

・R&D plan for achieving the goal through involving society and industry, etc.

# 3. Preparatory situation at the initiation of R&D projects

*\* Provide specific descriptions of the preparatory situation concerning the following points, including R&D trends in Japan and overseas.*

*- State of survey and verification of social and economic impacts*

*- Understanding of solutions for technological bottlenecks and their probability*

- Understanding of issues on social implementation (e.g. consideration of ELSI) and solutions

*- Progress of examination of activities aiming for the deployment R&D scenario (business model, transfer to companies, etc.)*

# 4. Special matters

*\* Describe the above-mentioned efforts which have already been started.*

**- Do not exceed 10 A4-size sheets (no exceptions) –**

# 5. Team to conduct this R&D project

**(1)** **Schematic illustration of an R&D team**

\* Illustrate an R&D team. Ensure that role allotment for goal achievement is clearly indicated. Also describe the initial and future R&D term in line with the proposed R&D project and plan. The illustration below is an example.

Main Joint Research Group c

From FY2019 participation (by open call)

## (2) Program Manager (PM)’s group

|  |  |  |  |
| --- | --- | --- | --- |
| Name of PM | Name of R&D institution1) | Title | Effort2) |
| OO OO | OO university graduate school OO department OO major | Professor | 10% |
| Name of R&Dparticipant3,4) | Affiliation (omit if same as above5 | Title |
| OO OO |  | Professor |
| OO OO |  | Associate professor |
| OO OO |  | Lecturer |
|  |  |  |

1. *If the organization you are currently affiliated with differs from the organization at which you propose to conduct the adopted R&D, describe the latter in the column relating to special matters and inform us of the reason you have chosen this institution.*
2. *In the “effort” column, enter the distribution percentages (%) for the time required for the research relative to 100%, which represents the Total work hours (including not only R&D activities but also education and therapeutic activities) of researchers in a year.*
3. *Fully describe the roles to be played by the members of the R&D group.*
4. *4) Add necessary information concerning the researchers participating in R&D. A description such as “X researcher” is acceptable in cases where the names of researchers are not known at the time the proposal is submitted.*

**(2-1) Role of groups in generating R&D ideas**

**(2-2) R&D outline**

**(2-3) Special matters**

*\** *Give details of situations (background, reasons, etc.) when work hours (effort) is necessary for completing special tasks (such as managers including the head of research departments or chairmen of academic associations in the process).*

**(3)** **Team of main joint researchers**

*\* When joint R&D groups (joint R&D institutions) outside of the institution the Programu Manager is affiliated with are required, describe each group separately. Describe all the joint research organization which concludes an R&D agreement with JST and is planned to be allocated R&D costs.*

*\* It is possible to include members of various research organizations affiliated with industries, universities, and the government in joint R&D groups.*

*\* There is no limit to the number of joint R&D groups; however, forming an optimal team for pursuing the R&D representative’s R&D idea should be the priority.*

*\* Add or delete tables depending on the number of R&D groups involved.*

*\* There is no need to describe names, affiliations, or titles of participants if details of the joint R&D group are not known. However, provide clearly understandable descriptions of the number of participants. In addition, describe in special matters the timing of the call for proposals and what kinds of organizations and researchers are expected.*

**① Joint R&D group a** *(example)*

|  |  |  |  |
| --- | --- | --- | --- |
| Name of main joint researcher | Name of joint R&D organization 1) | Title | Effort2) |
| OO OO | OO Institute OO Department OO team | Team leader | 10% |
| Researcher number6): 12345678Research organization code7): 1234567890 |
| Name of R&D participant3,4) | Affiliation (omit if same as above) | Title |
| OO OO |  | Chief researcher |
| OO OO |  | Researcher |
| Plan to employ two  |  | Special researcher |
|  |  |  |

*1)-4) See previous pages.*

1. *Include the eight-digit researcher number for the main joint researcher that was granted when the researcher’s information was registered in the R&D management system common to ministries (e-Rad [http://www.e-rad.go.jp/]).*
2. *Describe the code for affiliated research organizations of the R&D management system common to ministries (e-Rad [http://www.e-rad.go.jp/]).*

**(3-1) Role of groups in generating R&D ideas**

**(3-2) R&D outline**

**(3-3) Special matters**

*\* Give details of situations (background, reasons, etc.) when work hours (effort) is necessary for completing special tasks (such as managers including the head of research departments or chairmen of academic associations in the process).*

*\** *When adding an overseas R&D institution to the R&D team, see “2) Requirements for R&D team” of the Application Guideline, Chapter 2, “2.1.2 (4), Requirements for application,” and then describe in this column the reason the inclusion of joint researchers affiliated with overseas research organizations is necessary.*

**② Joint R&D group b**

\* Add or delete the joint R&D group such as "joint R&D group b" or " joint R&D group c" as necessary.

**(4) Other participating R&D organizations**

|  |  |  |
| --- | --- | --- |
| Name of R&D participant3,4) | Affiliation | Title |
| OO OO | OO Institute OO Department OO team | Chief Researcher |
| OO OO |  | Researcher |
| XX XX | XX Co., Ltd. XX Institute | Chief Researcher |

*\* Private firms, universities and individuals, etc. that have not signed an R&D agreement with JST in regard to participation but that are collaborating and cooperating with research groups that have signed an R&D agreement with JST relating to participation.*

**(4-1) Roles of participating organizations in R&D ideas**

**(4-2) Special matters**

\* When adding an overseas R&D institution to the R&D team, see “2) Requirements for R&D team” of the Application Guideline, Chapter 2, “2.1.2 (4), Requirements for application,” and then describe in this column the reason the inclusion of joint researchers affiliated with overseas research organizations is necessary.

**6. The R&D representative’s management policies**

**(1) Policies for R&D management**

\* Improvement, correction of proceedings, introduction of new findings and technologies, policies for developing results

**(2) Policies for managing intellectual property**

\* Policies for managing intellectual property should include the following:

- A basic idea of the Principal Investigator concerning how to build a management system and manage the intellectual property of the project.

- A basic description of how R&D results created by this research project will be grouped so that they are not considered to constitute intellectual property; in addition, a basic plan for deciding whether the results should be disclosed or not to the public.

- A basic plan concerning acquiring and maintaining or abandoning or transferring (including how to obtain funding) intellectual property rights during and after researching this project.

**7. Other**

\* Describe the current status of preparations and examinations as to the support measures and systems at major research organizations.

\* If there are conflicts of interest with the R&D supervisor, describe the specific contents. In addition, if there are conflicts of interest with the R&D proposer of this proposal, describe the specific contents. Check (2) Managing the conflicts of interest (persons engaged in selection) in the Application Guideline, Chapter 2, “2.3.3 Selection method” for the definition of conflicts of interest.

# R&D Budget (Form 4)

*- Provide R&D budget plans by the item and R&D group separately for every fiscal year.*

*- A more detailed R&D budget plan needs to be submitted at the time of the selection interview.*

*- R&D expenses may be reviewed at the time of adoption or during the R&D period, depending on the total budget situation, management by the discretion of the R&D supervisor, and project evaluations.*

*- Form an optimum R&D team that is necessary and adequate for realizing the research ideas of the R&D Principal Investigator (PM). The R&D group, if formed, needs to be indispensable to the realization of R&D ideas and must be able to make great contributions to the goal.*

**○ R&D cost plan by expense account (for a whole team)** *(example)*

(Unit: million yen)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **1st year**(2020 Nov. -2021 Mar.) | **2nd year**(2021 Apr. -2022 Mar.) | **3rd year**(2022 Apr. -2023 Mar.) | **4th year**(2023 Apr. -2024 Mar.) | **Total** |
| **Direct costs** | **Equipment** | *148* |  |  |  |  |
| **Supply** | *50* |  |  |  |  |
| **Travel** | *4* |  |  |  |  |
| **Personnel & gratitude****(number of researchers)** | *22 (4)* |  |  |  |  |
| **Other** | *16* |  |  |  |  |
| **Direct cost total** | *240* |  |  |  |  |
| **Indirect costs** | *72* |  |  |  |  |
| **Subtotal** | *312* |  |  |  |  |
| **Estimated fund introduction by fund introducing organizations** | *0* |  |  |  |  |
| **Total** | *312* |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **5th year**(2024 Nov. -2025 Mar.) | **6th year**(2025 Apr. -2026 Mar.) | **7th year**(2026 Apr. -2027 Mar.) | **8th year**(2027 Apr. -2028 Mar.) | **9th year**(2028 Nov. -2029 Mar.) | **Final year**(2029 Nov. -2030 Mar.) | **Total** |
| **Direct costs** | **Equipment** | 148 |  |  |  |  |  |  |
| **Supply** | 60 |  |  |  |  |  |  |
| **Travel** | 4 |  |  |  |  |  |  |
| **Personnel & gratitude****(number of researchers)** | 22(4) |  |  |  |  |  |  |
| **Other** | 16 |  |  |  |  |  |  |
| **Direct cost total** | 250 |  |  |  |  |  |  |
| **Indirect costs** | 75 |  |  |  |  |  |  |
| **Subtotal** | 325 |  |  |  |  |  |  |
| **Estimated fund introduction by fund introducing organizations** | 82 |  |  |  |  |  |  |
| **Total** | 407 |  |  |  |  |  |  |

\* R&D cost accounts and their uses are as follows:

 - Equipment: purchases of facilities and equipment

 - Supply: purchases of supplies

 - Travel: travel expenses for the Principal Investigator and researchers

 - Personnel & gratitude: personnel costs of researchers, engineers, research aids, and RA (\*), as well as for providing tokens of gratitude

\* See the Application Guideline, Chapter 4. “4.13. Improving the treatment of (latter-stage) doctoral students” for RA (research assistant).

**○ Special matters**

\* Stipulate optimum budget and ratio for each account.

\* If applicable, describe the reasons personnel expenses exceed 50% of the total R&D expenses or supply expenses and travel expenses exceed 30% of the total R&D expenses.

**○ R&D budget plan by group**

\* Propose a necessary, adequate, and optimum team composition for realizing the R&D representative’s R&D ideas. A joint research group is essential for realizing a research idea and can greatly contribute to achieving a research objective.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| (entry example) | **1st year**(2020 Nov-2021 Mar.) | **2nd year**(2021 Apr.-2022 Mar.) | **3rd year**(2022 Apr.-2023 Mar.) | **Total**(million yen) |
| PM GroupOO university | 20 | 40 | 25 | 145 |
| Joint research G-aXX university | 20 | 30 | 10 | 80 |
| Joint research G-bXX university | 17 | 24 | 9 | 75 |
| **Direct costs total** |  |  |  |  |
| **Indirect costs** |  |  |  |  |
| **Total** (million yen) |  |  |  |  |

○ **Major facilities to be utilized** (name of instrument, installation site)

**○ Major facilities planned for purchase** (more than 5,000 thousand yen for every order, name of instrument, approximate cost)

(example)

Group A:

 XXXXXXXXX 15,000 thousand yen (Purchase fiscal year )

 XXXXXXXXX 5,000 thousand yen (Purchase fiscal year )

 XXXXXXXXX 10,000 thousand yen (Purchase fiscal year )

Group B:

 XXXXXXXXX 7,000 thousand yen (Purchase fiscal year )

 XXXXXXXXX 10,000 thousand yen (Purchase fiscal year )

**R&D Project Proposer (Program Manager) (Form 5)**

**○ Basic information on the Program Manager (PM)**

|  |  |
| --- | --- |
| Name |  |
| Nationality/gender |  | Birth date (A.D.) |  |
| Affiliation, title |  |  |
| Address |  |
| Academic history(after graduation from college) | Academic history:*(Filling-in example)**OO year OO university OO department graduation**OO year OO graduate school OO department master’s course**OO major**OO year OO graduate school OO department doctoral course OO major**OO year Ph.D. (OO major) (OO university)* |
| Career track(main history and research contents) | Job history:*(Filling-in example)**OO year-OO year OO Co., Ltd OO R&D department (development of OOOO)**OO year-OO year OO university special associate professor (research on OOOO)**OO year-OO year OO Co., Ltd OO department (in charge of OO)* |
| Other special matters | *(voluntary description on social contributions, international**activities)* |
| Information on quality and experience | *(major experience and achievement related to management of R&D aiming for commercialization or converting advanced technologies to business, and reasons of eligibility as the PM required by this program)* |
| Effort after adopted as PM | 　　　% (planned) |

# List of Achievements, Results of Evaluation at Completion, List of Patents (Form 6)

**1. Main papers and books related to this R&D proposal *(up to 15 items)***

*\* Describe items below for papers (the same applies to books).*

*\* Place a “●” mark in front of a paper cited in Form 4.*

1. Main papers and books by the program manager (PM)

*\* Authors (all authors), name of the paper, journal, volume, page, year*

1. Main papers and books by the main joint researchers

*\* Authors (all authors), name of the paper, journal, volume, page, year*

**2. Papers and books besides other than those stated above *(up to 30 items)***

(1) Main papers and books by the program manager (PM)

(2) Main papers and books by the main joint researchers

**3. Evaluation at the completion of the research project of another competitive funding system for which the R&D representative served as a representative**

*(Only those disclosed after fiscal year 2014)*

**4. List of intellectual property rights related to this proposal**

*\* Place a “●” mark in front of each of the important intellectual property rights*

*\* For specific subjects and definitions, see “Intellectual Property Management Basic Policy”* (https://www.jst.go.jp/contract/download/2020/2020mirais305manua.pdf)*).*

# Other Funding Supports (Form 7)

*\* If the Principle Investigator (PM) and Main Joint Researchers are receiving, applying for, or planning to apply for alternative funding systems or other research subsidies (including from private foundations or overseas organizations), describe the R&D title, R&D period, role, amount of R&D expenses received, and efforts made thus far for each of system or subsidy. Also, see the Application Guideline, Chapter 4, “4.2 Measures against unreasonable duplication and excessive concentration.”*

*\* If a description is found to be false, an adopted proposal may be cancelled later.*

*\* If, during the selection process for this R&D proposal, a description in this form requires alteration because the research subsidies applied or planned to be applied for, as mentioned above, have been altered, correct this form and send a notification e-mail to the contact details provided at the end of these application requirements.*

*\* Copies of the application documents and plans submitted to other systems may be requested during the selection interview.*

*(example)*

**Program Manager: *XX XX (name)***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name of program** | **Situation** | **Name of R&D projects****(name of representative)** | **R&D****period** | **Role****(representative/shared role)** | **(1) Received expenses** **(whole period)****(2) (FY2021 planned)****(3) (FY2020 planned)****(4) (FY2019 actual)** | **Effort****(%)** |
| JST-Mirai Program (this Proposal) | Applied |  |  | Representative |  |  |
| Grant-in-Aid for Scientific Research(S) | Received | ◊◊ creation by xx(OOOO) | 2017Apr.-2021 Mar. | Representative | (1) 100,000 thousand yen(2) 50,000 thousand yen(3) 25,000 thousand yen(4) 5,000 thousand yen | 20 |
| JST Strategic Basic Research ProgramsCREST | Applied | ◊◊ upgraded function by xx(OOOO) | 2019 Oct.-2024 Mar. | Shared role | (1) 140,000 thousand yen(2) 35,000 thousand yen(3) 8,000 thousand yen(4) - |  |

*\* List, in descending order of the amounts received (over the entire period), subsidies received or expected to be received. Then, describe subsidies applied for and those that you plan to apply for, if applicable.*

*\* If a subsidy is being received or you expect to receive it, enter “received.” Enter “applied” if you have applied for but not yet received a subsidy or if you plan to apply for a subsidy.*

*\* Describe representative or shared duties under “role.”*

*\* Enter the R&D expenses (direct costs) received by the PM.*

*\* Describe the distribution ratio of the time required to perform the research relative to 100%, which represents total annual work hours (including not only time for research activities but also educational and therapeutic activities) under “effort” [as defined at the Comprehensive Science, Technology, and Innovation Convention].*

*\* Only account for efforts expended or planned to be expended on the presumption that a proposal is adopted by JST-Mirai program, not efforts made in regard to proposals submitted to other research organizations, such as those applied to or those planned to be applied to. The total efforts made during the entire R&D period and efforts made toward subsidies being received should not exceed 100%.*

*\* Add or delete lines as necessary.*

*(example)*

**Main Joint Researcher a: XX XX (name)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name of program** | **Situation** | **Name of R&D projects****(name of representative)** | **R&D****period** | **Role****(representative/shared role)** | **(1) Received expenses****(whole period)****(2) (FY2021 planned)****(3) (FY2020 planned)****(4) (FY2019 actual)** | **Effort****(%)** |
| JST-Mirai Program (thisProposal) | Applied |  |  | Shared |  |  |
| MHLW, Grants-in-Aid for Science Research | Received | ◊◊ creation by xx(OOOO) | 2017.May-2021. Mar. | Representative | (1) 50,000 thousand yen(2) 20,000 thousand yen(3) 20,000 thousand yen(4) 5,000 thousand yen | 10 |
|  |  |   |  |  | (1) thousand yen(2) thousand yen(3) -(4) - |  |
|  |  |  |  |  |  |  |

*(example)*

**Main Joint Researcher b: XX XX (name)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name of program** | **Situation** | **Name of R&D projects****(name of representative)** | **R&D****period** | **Role****(representative/shared role)** | **(1) Received expenses****(whole period)****(2) (FY2021 planned)****(3) (FY2020 planned)****(4) (FY2019 actual)** | **Effort****(%)** |
| JST-Mirai Program (thisProposal) | Applied |  |  | Shared |  |  |
| OO Foundationxx Research Grants | Received | ◊◊ creation by xx(OOOO) | 2018Apr.-2020 Mar. | Representative | (1) 2,000 thousand yen(2) 0 thousand yen(3) 1,000 thousand yen(4) 1,000 thousand yen | *15* |
|  |  |   |  |  | (1) thousand yen(2) thousand yen(3) -(4) - |  |
|  |  |  |  |  |  |  |

# Protection of Human Rights and Compliance with Laws and Regulations (Form 8)

*\* Describe the measures and actions that you will take if your R&D involves compliance with the related laws and regulations (e.g. research requiring the consent and the cooperation of the other party when implementing the research plan, research requiring consideration for the handling of personal information and research requiring efforts regarding security export control, bioethics and safety measures).*

*This applies to surveys, research, experiments which require an approval procedure in an ethics committee inside and outside the research institution, such as for example questionnaire surveys in which personal information is involved, interview surveys, the use of provided samples, analysis study of the human genome, recombinant DNA experiments, experiments on animals, etc.*

*\* When your R&D team includes an overseas joint R&D group, be sure to describe the preparedness on regulations concerning security export control both in PM's R&D group and the domestic joint research group.*

*\* Please indicate where this is not applicable.*

# References (Form 9)

*\* Provide the names of two (2) individuals who have good knowledge of your R&D Project (non-Japanese person(s) are acceptable). Provide names of the reference person, institution and contact information (phone numbers and e-mail address). The evaluators (JST and R&D Supervisor) may contact them regarding the R&D proposal during the screening (advance evaluation) process.*

*\* Providing this reference information is not mandatory.*