FY2022

Instructions for Preparing a Proposal of Strategic Basic Research Programs：ACT-X "Hardware in Future for Resilience of Real Space"

As for "Overview", "Research Supervisor's Policy on Call for Application, Selection, and Management" and "Strategic Objective" of the research area to be applied for, please see the following URL and select the research area.: https://www.jst.go.jp/kisoken/boshuu/teian/en/top/ryoiki.html.

For a research applicant, researcher ID for e-Rad must be required in order to submit a proposal. Ensure that you have deleted "Proposal Preparation Checklist" before submitting proposal documents.

(note 1)   This is the form proposal in the research area " Hardware in Future for Resilience of Real Space" supervised by Shuji Tanaka. Proposals submitted in an incorrect form will not be accepted.

(note 2)   If there is a defect in a proposal document uploaded to e-Rad that makes it difficult to review the proposal, the proposal will not be accepted. Please be attentive to the preparation of documents. "Defects that make a review difficult" refers to missing documents (especially, form 1: cover of proposal documents), garbled characters that make a review difficult, and the absence of important entry items in a proposal. JST shall not be held responsible for any defects in proposal documents that appear before a deadline for proposal applications, whether or not the proposal is accepted. Therefore, please be aware that JST makes neither an amendment of the proposal upon prior confirmation by the applicant, nor a request for the applicant to correct proposal documents before a deadline of submission. A research applicant can not withdraw his/her proposal on e-Rad after the deadline.

(note 3)   For the items that are included in both e-Rad and a proposal document, if the descriptions are not same, the information in the proposal document takes precedence.

Research Proposal (Form) Completion Requirements

A list of documentation to submit is shown below. Prepare research proposals by following the research proposal completion requirements on the next page and the following pages. Please use the Research Proposal Form of this year. Some research areas require that the original proposal forms be used. Please ensure that you download and use the proposal form of the research area to which you are planning to apply.

When preparing a proposal, you are requested to refer to the "Overview" and "Research Supervisor's Policy on Call for Application, Selection, and Management" of the research area.

Form No.	Document
Form　1	Cover of research proposal documents (within one page)
Form　2-1	Research Proposal Overview　(within two pages)
Form　2-2	Major Achievements of the Applicant (within one page)
Form　3-1	Project Description　(within three pages)
Form　3-2	Research schedule　(within one page)
Form　4	List of Achievements/ Ex-Post Evaluation Results
Form　5	Other Supports
Form　6	Protection of Human Rights and Compliance with Laws and Regulations
Form　7	Other Special Remarks (within two pages)

* File sizes should not exceed 3MB in total.

* Check application guideline "5.1.1 Conflicts of Interest Involving Research Project Applicants and the Research Supervisor" and "Proposal Preparation Checklist (whether there is conflict of interest between the applicant and the research supervisor)" before preparing proposal documents. If there should be any item for which it is difficult to make a clear judgement, download the form for questions regarding conflict of interest from the website for research proposals, fill in required items, attach the file, and send it to the email address indicated below.

URL of the Enquiry Form download:
https://www.jst.go.jp/kisoken/boshuu/teian/koubo/inquiry_en.docx
Addressee: rp-info@jst.go.jp
Title: "Conflict of Interest" "ACT-X name of research supervisor of the research area to which the application is submitted" Affiliation and name of researcher submitting the proposal

*See also the user manual of e-Rad: https://www.e-rad.go.jp/en/manual/for_researcher.html

*Researchers must understand Application Guideline "Chapter 8: Key Points in Submitting Proposals" and "Chapter 9: Limitations on the Multiple Application within the Strategic Basic Research Programs" before making an application.

FY 2022 Application ACT-X Research Proposal

Fill in form 1 within one page of A4 paper (observe strictly).

You may delete notes in italics in this and other forms. When information entered in e-Rad is different from that in research proposal documents, the latter will be considered correct.

Research Area	**Hardware in Future for Resilience of Real Space**
Title of proposed research project	*When the theme is in English, describe the theme in Japanese (about 20 characters) along with the English theme*
Name of Applicant	
Date of birth, age, and gender	Month, Day, Year (Age:　　as of April 1st, 2022)　male / female
Affiliated Institution, Section, Title	*Describe the affiliation and title accurately without any omission. (i.e., describe Graduate school, Department, Majors, XX laboratory, and project/tenure/associate/assistant professor).* *For students, enter the master's / doctoral school year in addition to the department.*
Academic Background	*(Entry example)* *Graduated from Faculty of xxxx, xxxx University, in 20XX* *Graduated from Engineering xxxx major, Graduate School xxxx of r xxxx University in 20XX* 　　*(Instructor: Professor xxxx)　【Instructor Name Required】* *Completed Ph.D. in Graduate School of xxxx University in 20XX* 　　*(Instructor: Professor xxxx)　【Instructor Name Required】* *Doctoral Acquisition (xxxx) (xxxx university) in 20XX*
Professional Appointments and Awards	*(Entry Example: It is essential to include the director's name of the belonged laboratory.)* *Research history:* 　*Assistant Professor, Faculty of xxxx of xxxx University in 20XX to 20XX* 　　*Research about xxxx in the professor xxxx's laboratory* 　*Researcher of xxxx Research Institute from 20XX to 20XX* 　　*Engaged in xxxx research in the xxxx laboratory of professor xxxx* *Major Awards Received:* 　*xxxx Award Winner in 20XX* 　　*Reasons for receiving award: Excellent achievements in xxxx study*
Information of Applicant	URL: *Please indicate URL if there are any websites where the information of the applicant is available (such as a website of his/her laboratory or researchmap webpage, etc.).*
Research period	From October 2022 to [Month Year] ([xx] years) Do not include the period of the acceleration phase.

Total Research Budget	Total Budget: thousand yen (Please assume even maximum less than 10,000,000 yen.) *(Do not include decimal point. Pay attention to the unit\<thousand yen\>. (check if the expenses exceed the upper limit set for research expenses stipulated in the "Research Supervisor's Policy on Call for Application, Selection, and Management". Do not include indirect cost.)*
Site for conducting research (planned site entered in the contract with JST)	☐ affiliation above (If more than one, please list one) ☐ other ( )

Research Proposal Overview

Outline

・In Form 2-1, Provide an overall description of the research proposal <u>within two A4-size sheets (no exceptions)</u>. Use 10.5 point or larger font size (If these instructions are not followed, the research proposal might not be accepted). <u>Unlike form 3-1 (project description), it is not allowed to cite numbers of papers that are shown in the list of achievements (form 2-2, form 4).</u>

・Form 2-1 is an important material for documentation-based selection to be evaluated from the perspectives below:

1. <u>Is it aligned with the goals of the solicited Research Area? (Can the proposal be expected to contribute to fulfilling the purpose of the Research Area? Mainly, does the proposal correspond to items a. and b. in "(1) Selection Standards (Preliminary Evaluation Standards)" in Section 5.1.3, "Selection Perspective" of Application Guideline?)</u>
   <u>"a. --- The research proposal contributes to the achievement of a Strategic Objective"</u>
   <u>"b. --- The research proposal is Consistent with the Research Area purpose"</u>

2. <u>Is it aligned with the goals of the ACT-X Program? (Mainly, does the proposal correspond to the goal noted in c. in "(1) Selection Standards (Preliminary Evaluation Standards)" in Section 5.1.3, "Selection Perspective" of Application Guideline for "Basic research that is original, challenging, innovative, and expected to attain high-quality basic researches by international standards over the coming decades and generate new values necessary for scientific and technological innovations"?)</u>

   Therefore, in this form, provide a brief description that focuses on the details corresponding to Item 1, "Background and Objectives," of ACT-X Form 3-1 (Project Description), and provide the minimum explanation (corresponding to Items 2 to 5 of Form 3-1) required to understand your description above.
   The scientific/technical evaluation of the validity of the Project Description will be considered mainly with ACT-X Form 3-1.

・A preliminary selection entailing a documentation-based selection for each Research Area may be held from the perspectives of 1) and 2) above.

・Insert figures and tables (in color, permitted) appropriately to be undertaken clearly.

Major Achievements of the Applicant

List of principal research papers / invited lectures

・In Form 2-2, on <u>one page of A4-size sheet (no exceptions)</u>, list your principal research papers and invited lectures (If this instruction is not followed, the research proposal might not be accepted).

・Adjustment to font size and line spacing is acceptable.

(1) List of principal research papers （within 5 papers）

・ From　ACT-X Form 4, Item 1, select a maximum of 5 principal research papers by the applicant and list them here (Use the same description and format as from　ACT-X Form 4, Item 1)

・Make entries retrospectively from the present to the past years of publication.

・Sequentially number each item with a number at the beginning of each title.

・The following items should be entered for a paper (books follow the same guidelines). The items may be in a freely chosen sequence.

[Items to be entered]

Authors (enter all authors and underline the applicant), title of a paper, journal in which the paper is published, volume, page, and year of publication

(2) List of principal invited lectures （within 5 lectures）

・List a maximum of 5 principal invited lectures by the research project applicant

・Sequentially number each item with a number at the beginning of each title.

(3) Other achievements （within 5 achievements）

・List a maximum of 5 achievements except for (1), (2) (i.e. creations, researcher activities).

・Sequentially number each item with a number at the beginning of each title.

Project Description

- Clearly state the work to be undertaken. Figures and tables (in color, permitted) may be included if necessary.
- For Form 3-1, do not exceed three A4-size sheets (no exceptions). Use 10.5 point or larger font size (If these instructions are not followed, the research proposal might not be accepted).
- In this form of project description, make effective references to the descriptions of achievements listed in Forms 4 to clarify the relationship between the achievement and the research being proposed by the research project applicant. In making the references, the numbers listed in the forms can be quoted in this form.

1. Background and Objective

Please state the purposes of your proposal and provide any background to your conceptions, including connections with your research work to date. Furthermore, specifically explain new values necessary for scientific and technological innovations this proposed research would generate."

In addition, describe shortly scientific and technological impacts of the results and expected societal changes as a result of the impacts from the viewpoint of "scientific and technological innovation" while taking into consideration the purpose of the research area to which the proposal is submitted. Explain details in "5. Future Prospect of Research."

2. Target of proposed research project

Describe briefly (within 60 words) the research target at the end of the proposed research project.

3. Research Plans and Approach

If the total budget (direct expenses) exceeds 6,000,000 yen, please briefly describe the reason. Please assume even maximum less than 10,000,000 yen.

* The standard amount of research expenses (direct expenses) is set for each area. Please refer to Chapter 6 "Policy of Research Areas Calling for Proposals" in the application guidelines.

Describe specific research items and how to advance them (including problems and solutions for each main research item predicted in achieving the objectives stated in the previous item.).

When describing research methods, compare the adopted method with existing ones and discuss the reasons why the technique has been selected.

When presenting the description, use preliminary findings and data as evidence for advancing research.

Furthermore, include in the explanation your ideas concerning "how to attempt mutual stimulation with researchers of the research area to which the proposal is submitted or related research fields to develop her/his research plan in relation to d of "Application Guideline 5.1.3(1): selection standards."

4. **Originality and novelty of the proposed research and comparison to current state of similar studies**

   - Consider the present state and trends of research in related fields in Japan and overseas to clearly show the position in the world, originality, novelty, and superiority of this research plan. Mention specific contents of competing research as required. Also explain in what aspect this research plan is original and challenging from ACT-X viewpoint as stipulated in "Applications Guideline 5.1.3(1): selection standards" c.

5. **Future Prospect of Research**

   -Concisely describe ideas of the research proposer concerning the scientific and technological impacts that results of this research plan may bring about in the future. Consider how the purpose of the research area to which an application is submitted is related to this research plan to explain ideas concerning contact points between results of future research and society (for example, creation of new technologies, acquisition and utilization of intellectual property rights, or their spread in and acceptance by the society).

Research Schedule

In Form3-2, describe on one page of A4-size sheet (no exceptions). If this instruction is not followed, the research proposal might not be accepted.

Enter the schedule of the proposed research project.

(The following is an example of 2.5 years research period.)

If proposed project consists of several research subthemes, state clearly schedules of each subtheme.

Length, position and thickness of arrows can be changed.

Example

Research Subjects	2022 Fiscal year (6 months)	2023 Fiscal Year	2024 Fiscal Year
1. XX related Gene Expression Analysis			
・Identification of XX related genes			
・Gene Expression Analysis			
2. Development and verification of model animal			
・Development of model animal			
・Verification of model animal			
3. Imaging Analysis			
・Data Collection			
・Development of software			
・Data Analysis			
4. Development of XX Diagnostic Method			
・Elucidation of XX Correlation			
・Development of diagnostic method and verification			

List of Achievements/Ex-Post Evaluation Results
【Author notation in English papers by the applicant：（example） *Taro Gijyutsu*】

In performing selection, evaluators (research supervisor, research area advisor) sometimes search through publication databases to check achievements in detail. This requires the entry of the applicant's name for publication [author notation in English papers by the applicant]. When you enter author names, abbreviations, for example T. Gijyutsu, are acceptable.

1. Principal papers, books, and other publications

· *List principal papers, books, and other publications, starting from the most recent to the past in reverse sequence of year of publication.*

· *Assign a serial number in front of a line. The number may be cited in the Project Description (form 3-1).*

· *Items to be included for papers are as follows (books follow the same guidelines). The items should be placed freely in any order.*

[items to be included]

Author (enter all authors and underline the applicant), title of published paper, journal, volume, page, publication year

2. Research papers/publications other than the above

· *In addition to 1 above, list papers, books, and other publications of the applicant, starting from the most recent to the past in reverse sequence of year of publication.*

· *Assign a serial number in front of each line. However, the numbers should be sequential starting with "1. Principal papers, books, and other publications related to this research proposal" (for example, when 10 papers are cited for 1. "Principal papers, books, and other publications related to this research proposal" papers cited in this item 2. should begin with "11" followed by serial numbers.*

· *Items to be included for papers are as follows (books follow the same guidelines). The items should be placed freely in any order.*

[items to be included]

Author (enter all authors and underline the applicant), title of published paper, journal, volume, page, publication year

3. Major Patent

List principal patents related to the proposed research.

[describe the below]

- *Submission No, Inventors Name, Title, Affiliation, Submission Date*

4. **Ex-Post evaluation of research projects that the research applicant represented in other systems of competitive research funds**

Enter in the table below a list of projects that the applicant represented (restricted to those disclosed within the past 5 years) and for which Ex-post evaluation is disclosed. Delete the table and enter "not applicable" if no relevant project exists.

Number	Research Program	Research Project (Fiscal Year Implemented)	URL of website with Ex-Post evaluation result *if the website contains many projects that are not those of yourself, write page numbers of your own project to facilitate checking by evaluators.
1			
2			

Information on Other Supports

[Notes]

・Enter the research project, research period, role, amount of research funds received, and effort for each research project concerning competitive national funding programs (including CREST, PRESTO, ACT-X, AMED-CREST, PRIME) or other research funds (all current research funds for individual research subjects, such as subsidies, grants, joint research funds, contract research funds, etc., including those from overseas) from which the applicant is receiving funds or for which an application is being or is planned to be made. Also see application guideline "Chapter 8.1 Measures against Unreasonable Duplication and Excessive Concentration" and "Chapter 9 Limitations on the Multiple Application within the Strategic Basic Research Programs." In the case that it is difficult to enter due to unavoidable circumstances such as being unable to enter based on the contents of the confidentiality agreement that has already been concluded, it is possible to submit this research proposal without filling in any items other than effort. Please noted that this information will be provided to the reviewers at the time of proposal selection.

・If the information entered in the research proposal differs from reality, <u>the research project may be rejected</u>.

・JST may ask for application and plan documents submitted to other systems when a proposal reaches the interview stage.

・Enter this proposed ACT-X project first, followed by other research projects <u>in a descending order of the amount of research funds (for the whole period, only direct cost)</u> the applicant receives.

・Add rows if needed.

If a student uses the supervisor's e-Rad ID and describes that the effort rate is 1% on the e-Rad, fill out this proposal form with the actual effort ratio (eg, 50%). At that time, enter the percentage (%) of the time spent on ACT-X research out of 40 hours a week as "effort".

Example

No.	Program (Name of Institution)	Status	Title of Project (Name of Principal investigator)	Research Period	Role (Principal Investigator or co-Principal Investigator)	Research Fund Received (1) Allocated Budget (For entire period) (2) FY 2022 (planned) (3) FY 2021 （Thousand yen/unit）			2022 FY Effort (%)
-	ACT-X (This application)	Submitted	Enter the effort ratio in the right box →→→→→→						70
(1)	*Grants-in-Aid for Scientific Research, Fundamental research (C)* *(Japan Society for the Promotion of Science)*	*Awarded*	*Creating W by V (** **)*	*2019.4 — 2023.3*	*Principal Investigator*	*(1)*	*1,000*		*20*
						(2)	*500*		
						(3)	*300*		
(2)	*X Foundation/Y Research grant* *(○○Foundation)*	*Submitted*	*Achieving high performance in X by Y (** **)*	*2021.9 — 2023.3*	*Co-Principal Investigator*	*(1)*	*900*		*10*
						(2)	*400*		
						(3)	*-*		
(3)						(1) (2) (3)			

(*) When applying, the call of FY2021 is made based on the fact that the "Integrated Innovation Strategy 2020" stipulates that "disclosure of information on the status of acceptance of foreign funds is a requirement when applying for research funds." Therefore, it is clarified that research funds from overseas should also be entered in the form of "whether or not there is other support" (or "status of application / acceptance of research funds, etc." depending on the project). In addition to competitive funds, both domestically and internationally, please list all research funds such as grants from private

foundations, contract research expenses from companies, and joint research expenses.

【*Notes for Description*】
* *If it is difficult to enter due to unavoidable circumstances such as being unable to enter based on the contents of the concluded confidentiality agreement, etc., it is possible submit the application without filling in items other than effort.*

(1) Status
 Enter one of the following.
 Do not enter effort for a theme corresponding to "Submitted" except for the ACT-X proposed theme.

 Awarded: *It is currently awarded, or decided to be awarded.*
 Submitted: *It is at the state of selection and it is yet to be decided to be awarded.*

(2) Role
 Enter one of the following.

 Principal Investigator:
 Research fund is to be received as a representative for the research theme.
 Co-Principal Investigator:
 Research fund is to be received as a person in a non-representing position for the research theme

(3) Research fund received

 Enter the amount of the research fund in thousand yen in a following manner.

 (a) *Awarded as "Principal Researcher" in the research project*

 Enter the amount of the research fund of the team supervised by the Principal Researcher, excluding that of joint research teams.

 (b) *Awarded as "Co-Principal Investigator"*

 Enter the amount of the research fund of the joint research team represented by the Co-Principal Researcher.

(4) Effort

 Enter "ratio of time (%) necessary for conducting research relative to 100% for the whole work hours during the ACT-X research period (2022.10-2023.3) in fiscal year 2022 if adopted for ACT-X. (If a student is an applicant, describe the percentage of time spent for ACT-X research in 40 hours per week as "effort".) Do not enter effort for themes that are already applied and in the process of selection, or that are planned to be applied (those entered as "Submitted").

 Take care that the sum of effort for the theme proposed for ACT-X and other themes that are entered as "Awarded" does not exceed 100%.

Protection of Human Rights and Compliance with Laws and Regulations

It is confirmed that laws and guidelines to be complied with have been understood and drawn up for this research plan. Furthermore, we confirm that laws and guidelines will be complied with in implementing this plan.

(Examples of laws and guidelines to be followed)

■"Guidelines for handling dishonest conduct in research activities" (decision by Minister of Education, Culture, Sports, Science and Technology, August 26, 2014, including succeeding revisions)

■"Guidelines for management and audit of public research fund by research organizations (criteria for implementation), put in effect on February 18, 2007"/revision February 18 2014, decided by the Minister of Education, Culture, Sports, Science and Technology, including succeeding revisions"

■Concerning control for trade security (dealing with technology leaks to overseas parties), foreign exchange and foreign exchange law, laws, ministerial ordinances, and official notices set out by ministries to prevent the results of advanced research from being passed to those who are suspected to conduct activities including applications for military purposes, such as those who develop weapons for mass destruction or terrorist groups

■Laws of related countries when conducting research overseas (including taking out biological resources) or joint research with an overseas research organization

■As for research in life science, laws, ministerial ordinances, and ethical guidelines set out by ministries for life ethics and security

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(Enter a check mark in the box when confirmed）

☐ Confirmed

Other Special Remarks

In Form 7, Provide an overall description of other special remarks in less than two A4-size sheets (no exceptions). If this instruction is not followed, the research proposal might not be accepted). For items that have check boxes, please check the applicable ones.

Conflict of interest between the applicant and evaluators

Conflict of interest between the research applicant and evaluators (research supervisor, research area advisor)

Follow the description of application guideline "5.1.2 (2) Conditions for those with conflict of interest" to describe conflict of interest of the research applicant shared with the research supervisor or research area advisor of the research area to which the proposal is submitted.

(Item 1)   Conflict of interest with research supervisor: ☐YES   ☐NO
If YES, state the reason
(Example) The research applicant conducted joint research with the research supervisor on ○○ project(20xx-20xx). It comes under condition (f) for conflict of interest stipulated in 5.1.2(2).

(Item 2)   Conflict of interest with research area advisor(s):   ☐YES   ☐NO
If YES,
-Describe the name of research area advisor with conflict of interest: (The Advisor's Name)
-State the reason
*(Example) The research applicant is conducting joint research with the advisor in ** project.*
It comes under conditions (c) for conflict of interest stipulated for 5.1.2(2).

<Note for Description>
(a) Conflict of interest between the research applicant and the research supervisor (as evaluator)
As shown in the Application Guideline "5.1.1 Conflicts of Interest Involving Research Project Applicants and the Research Supervisor", the applicant is excluded from the selection process if the relationship between the applicant and the research supervisor comes under the definition of conflict of interest stipulated in the guideline.

In this item, describe conflict of interest shared with the "research supervisor as an evaluator" stipulated in the Application Guideline "5.1.2 (2) Conditions for those with conflict of interest." Even if the relationship does not come under conflict of interest that fringe on a restriction for proposal stipulated in Application Guideline "5.1.1 Conflicts of Interest Involving Research Project Applicants and the Research Supervisor," concisely explain the situation when any one of the following conflict of interest exists between the applicant and the research supervisor.

＜Cases in which conflict of interest is observed between a research applicant and the research supervisor as evaluator, although the applicant is not excluded from selection process＞

【5.1.2(2) b　Current affiliation with the same department/major* at a university or other national government-funded research and experiment institution】

*note: the same department/major means 1 upper level organization from a laboratory which an applicant has involved in.

【5.1.2(2) e　Relationships of direct competition】

【5.1.2.(2) f　Other relationships judged by JST to represent conflicts of interest】

(Example: In the past the research applicant had a close student-teacher relationship or close joint research with the research supervisor.)

If JST judges that "conflict of interest exists although the research supervisor is not excluded from selection process" on the basis of this information, JST will ask the research supervisor to refrain from expressing their opinion in discussions about the selection of the pertinent research applicant during the review of documents and the interview.

(b)　Conflict of interest between the research applicant and the research area advisor(s)

Describe whether conflict of interest exists between the applicant and the research area advisor. When conflict of interest is observed, concisely describe the reason including whether the conflict of interest comes under a condition of application guideline "5.1.2 (2) Conditions for those with conflict of interest." A research area advisor that JST judged to share conflict of interest based upon the description is excluded from reviewing the proposal and is asked to refrain from speaking at the selection process and not to participate in the interview for selection. For this reason, be sure to clearly enter the name of the research area advisor with conflict of interest. As for a list of research area advisors, see the website for research areas to which applications are to be submitted, which is linked to the website for submitting applications.

[Application Guideline 5.1.2(2): Conditions for those with conflict of interest (summary)"]

(a)　Relatives

(b)　Current affiliation with the same department/major* or research lab as the research project applicant at a university or other national government-funded research and experiment institution, or current affiliation with the same company

*note: the same department/major means 1 upper level organization from a laboratory which an applicant has involved in.

(c)　Close cooperation on a joint research project (For example, working on a joint research project, publishing co-authored a research paper, working toward the same objectives as a member of the same research team, performed different parts of the same research project, or were otherwise essentially affiliated with the same research group).

(d)　Close teacher-student relationship, or a direct employer-employee relationship

(e)　Relationships of direct competition

(f)　Other relationships judged by JST to represent conflicts of interest

Current investment in your organization by JST

Current investment by JST:　　□YES　　□NO　 (If Yes, please write down the detail.)
　　The name of Institution: XXXXXX (president: YYYYYY)

(Only for those relevant) special notes for efforts by an applicant

Enter the situation and reasons when an applicant needs work hours (effort) for special duties (work of the academic committee or private company job, etc.).

Other special remarks: Differences from the previous application (in case of applications that have been made to the research area two times or more), Plan of change of research institute affiliation, other special notes