

unofficial translation

**SCIENCE AND TECHNOLOGY
BASIC PLAN**

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The government of Japan decides on the Science and Technology Basic Plan based on Clause 1, Article 9 of the Science and Technology Basic Law in 1995.

SCIENCE AND TECHNOLOGY BASIC PLAN

This English language version of the Science and Technology Basic Plan is a translation of an original document produced in Japanese. Any questions that may arise about the interpretation of this plan shall be resolved with regard to the original Japanese document.

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INTRODUCTION

Japan is not only facing globalization and intensive economic competition with other countries, but is aging at an unprecedented pace. People are deeply concerned that Japan is heading towards a crisis where the hollowing-out of industry, lack of society's vitality, and a worsening living standard are highly evident. Moreover, the future existence of humans as a whole is confronted about global environmental issues, food problems, and energy and resource shortages. With more Japanese people concerned about their spiritual affluence, it is increasingly necessary to build a pleasant community where people live with peace of mind. To deal with these problems in Japan and abroad, science and technology is expected to play a larger role.

Expectations for basic research are very high; it is not only a basis for innovative development in science and technology, but such development in itself is valuable as intellectual property for all humans to share. Japan, especially, is highly expected to boldly challenge unknown fields in science and technology. Science and technology makes it possible for the younger generations to hold hopes and dreams, as well as paving the way to a bright future for all humans. On the other hand, while science and technology has a growing impact on people with its benefits filtered into all parts of society, it is growing extremely advanced and complicated. Thus, it is necessary to acquire public understanding and interest as to the meaning, role, achievements, ripple effects, and development of science and technology.

The reality, however, is that science and technology in Japan has fallen into the most severe situations in recent years; on a national basis, investment in R&D decreased in fiscal 1993 and 1994, and has been on a decline in the private sector for three years in a row since fiscal 1992. Japan's official amount spent on research as compared to its GDP is less than that of major western nations, although such comparison does not take into account the differences in national defense expenses as well as the importance of the private sector in each nation.

As for R&D systems, there are various problems. Many elements in the systems that have long supported Japan's development are turning out to be hindrances as

society, the economy and the international environment changes. Such elements tend to lack flexibility and competitiveness, and instead hampers cooperation and exchanges beyond organizations. Regarding the R&D infrastructure, it is necessary to improve the facilities and equipment of universities and national research institutions which are superannuated. Development of information and intellectual infrastructures for R&D lags behind the United States and Europe. The total number of research supporters is significantly low compared to the number of researchers (including technicians, hereafter). Furthermore, there is concern over the “hollowing-out” of R&D activities.

As a result, the level of basic research is lower than that of Western nations and the gap is widening in not just a small number of fields. As science and technology advances, the public tends to avoid this field because it grows more difficult to understand, raising fears that younger generations, who are expected to develop Japan’s future science and technology, are shifting away from this area.

Based on the understanding of the expected role and reality of science and technology as discussed above, it is necessary to strongly advance efforts in science and technology in Japan. Top priorities include: to radically improve the environment so as to upgrade the R&D abilities of industrial, academic, and governmental circles; to formulate and carry out policies to make the best use of such improvements; and to facilitate all achievements for use by the public, society and economy.

Especially important are two entities: research at universities and national/public research institutes that should focus on basic research; and the role of the government in promoting R&D in accordance with social and economic needs. The role of the government is becoming increasingly essential in fulfilling international obligations, with its contribution to the world and all humans, and in promoting public understanding and interest in science and technology. It is necessary for the government to actively implement R&D in fields the private sector does not undertake to study, such as basic and original research.

Thus, it is important to implement science and technology policies systematically and actively with a view towards new perspectives and innovations.

In line with the Basic Policy for Science and Technology (approved by the Cabinet on April 24, 1992), and based on the Science and Technology Basic Law (November 15, 1995, Legislation No. 130), aimed at establishing a Japan based on the creativity of science and technology in order to promote comprehensive and systematic policies for the promotion of science and technology, the Science and Technology Basic Plan is formulated to materialize policies on science and technology for the next decade, especially focusing on fiscal 1996-2000.

Chapter 1 of this plan discusses comprehensive policies to promote R&D. It provides direction for R&D and improvements of systems and conditions for its promotion. Chapter 2 lays down concrete measures to be taken for the next five years based on the policies decided on in Chapter 1.

CHAPTER 1 COMPREHENSIVE POLICY ON RESEARCH AND DEVELOPMENT

I. The Basic Aims of Research and Development

To establish a nation based on the creativity of science and technology and to “upgrade the level of science and technology throughout Japan, thus contributing not only to our socio-economic development and improvement of our welfare, but for the advancement of science and technology in the world and the sustainable development of human society” (Chapter 1 of the Science and Technology Basic Law). The government will strive to promote R&D activities with its resources to cope with the socio-economic needs as follows:

- To assist in the invention of original and innovative technology to contribute towards the expansion of economic frontiers and the construction of a socio-economic infrastructure, to create new industries, and to cope with the rapid progress in information and communications in order to truly realize energetic and affluent lives.
- To assist in solving growing global issues on environment, food, energy, and resources as human activities expand and population grows, especially in developing countries, in order to achieve sustainable development while coexisting with earth and nature.
- To contribute to the promotion of health, prevention and treatment of diseases, and the averting of national disasters in order to construct a comfortable community in which people can enjoy living with peace of mind.

The government will actively promote basic research for the following reasons:

- Achievements in basic research aimed at discovering new laws and principles, creating original theories, and predicting and discovering unknown phenomena are in themselves valuable as intellectual assets to be shared by all humans; the results of basic research contributes to the advancement of culture and at the same time provides dreams and hopes for people.

- Such new achievements at times radically change technological systems or even creates completely new technological systems, bringing about various positive spin-offs for society.
- Deep understanding of the human race and nature constitute the very foundation of human development, based on harmony between man and the environment.

In addition to basic science, the government will promote major R&D activities based on the 18th Recommendation of Council for Science and Technology (January 24, 1992), a report on the “Comprehensive and Basic Science and Technology Policy Toward the New Century.” Major R&D activities incorporated into the report will be implemented in accordance with a series of R&D basic programs including the Basic Plan for Research and Development on Energy (July 18, 1995) and the Basic Plan for Research and Development on Advanced Fundamental Science and Technology (December 27, 1994), both of which were decided on by the primer minister. Furthermore, the government will review what subjects are to be promoted in line with basic aims of R&D promotion laid down by this basic plan, and if necessary, revise these plans or even draw up a new basic plan for R&D. The fields of major R&D activities will be reexamined, when necessary, in light of possible changes in situations hereafter.

The government will give consideration to the fostering of balanced R&D abilities and to the harmonious development of basic, applied and developmental research. The government will also ensure that both natural and cultural sciences will develop harmoniously. It is based on the understanding that, for the advancement of science and technology, their interactions are important. For example, to solve global issues such as problems with the environment, food and energy, reformations of social systems are needed in addition to the advancement of science and technology. In the case of research on the functions of the mind, approaches from linguistics and psychology are also required. The government will strive to harmonize human lives, societies and nature by giving special attention to the environment and ethics. Moreover, the autonomy of researchers and characteristics of research activities at universities will be

respected.

II. Constructing a New R&D System

To energetically promote R&D as discussed above, the government will construct new systems for R&D to cope with the new era, with an emphasis on research activities that make best use of the researchers' creativity. Exchanges among R&D institutions such as universities and research institutes, among national, private, and local governmental sectors, and among nations should be promoted and strengthened. Moreover, it is necessary to activate R&D in Japan as a whole by conducting impartial evaluations.

Thus, young people who aspire for science and technology will be able to hold hopes as contributors to a bright future. Moreover, science and technology will be a basis of Japan and it will be promoted with an open door to the world.

(1) Constructing a New R&D System to Facilitate Creative R&D Activities

It is important that each R&D institution and sector in Japan fulfill its own duties and responsibilities. To this end, it is necessary not only to maximize their R&D abilities for the development of creativity, but to realize an environment in which researchers can enhance their abilities and demonstrate their creativity.

For this purpose, it is necessary to create a lively environment that is attractive to researchers both in Japan and from abroad, along with the construction of an advanced R&D infrastructure. It is also important to build R&D systems so as to facilitate the following schemes for the entire research community:

To realize a flexible, competitive and open environment for R&D by:

- (a) Widening career path options for researchers to promote their mobility, thus further activating R&D, along with a group of stable and reliable researchers who have greatly contributed thus far to the advancement of science and technology in Japan (a career path is an individual's background and work experience, as a process of acquiring technical knowledge, skills and abilities through various activities).
- (b) Increasing and diversifying the funds available to researchers, especially expanding research funds granted under a competitive system, while distributing them effectively and efficiently.
- (c) Applying an organizational structure for researchers that can be managed flexibly and with mobility to cope with the development of R&D and changes in social conditions.
- (d) Ensuring various R&D activities are open to researchers in Japan and from abroad, so as to maximize their collective abilities.

To secure and train high quality researchers including locating creative personnel; especially to provide sufficient opportunities for energetic young researchers in order to intensify their training, and to create an environment where researchers can concentrate on their individual R&D activities.

To upgrade creative research abilities in non-national sectors.

The government will implement the following measures based on the schemes above:

- To introduce a term system for researchers, while striving to make the system work in Japan's research community, in order to promote the mobilization of researchers that is vital for the realization of a flexible and competitive R&D environment.
- To introduce a new system of employing researchers to national research

institutes on a fixed term, while streamlining working conditions. The system is to be designed to secure talented people or to work as a gateway to success for young researchers.

- As for university teachers, to take necessary measures, after promptly concluding the ongoing deliberation of the selectable fixed-term appointment system.

The government hopes that its private sector will also consider such reforms, while respecting its own conditions.

- To substantially expand various research funds to be given under a competitive system. Such funds include expenses to promote strategic basic research which is fully introduced in fiscal 1996. These competitive funds are expected to activate R&D through competition and cooperation among researchers, R&D institutions, and sectors. Such funds are one of the important element, along with priority funds aimed at diversifying R&D and basic funds, to be discussed later.
- To facilitate the flow of funds from the private sector to universities.
The government will promote the diversification of R&D funds by these means and also ensure the effective use of distributed funds by appropriate evaluation according to the nature of each fund.
- To allow the heads of R&D institutions greater discretion on the use of funds.
- To speed up and strengthen efficiency in the clerical procedures of the ministries and agencies in charge of budget administration.
- To give greater authority to the heads of R&D institutions so as to facilitate changes in organizational forms, if and when necessary.
- To use research funds which are effective in gathering talented people inside and outside of Japan, for example, research funds by the way of investments. This measure, together with a system of employing researchers on a fixed term and the expansion of fellowships are designed to further open the R&D environment.

- To enrich educational research at the graduate level.
- To increase the support of fellowship programs for young researchers.
- To improve and enrich natural science and technology education at universities and colleges of technology.
- To increase the number of post doctoral researchers and to enhance their quality; Japan lags behind in this area compared to major western nations, and to evaluate the experiences of each researcher as an important step of their career path. This measure lays groundwork for the fostering their abilities, and for a R&D system in which such a researcher can play an important role, strengthening Japan's R&D abilities. It is also necessary to construct an appropriate environment in which researchers can concentrate on their own work. The government will therefore create a system for obtaining outside support from outside of each institute while extending efforts at securing and training capable personnel who support R&D activities.
- To increase the support of private universities for expenses to upgrade research levels and for additional equipment and facilities to intensify the R&D infrastructure; and the research institutes of local government for creative R&D.
- To increase support of R&D that may be used to open new economic frontiers through new businesses, by small and medium-sized firms or other ambitious enterprises. The government will strengthen a system to fully utilize the originality and abilities of the private sector, and to share the funds and risks involved between industrial and governmental circles.

It should be remembered that an appropriate R&D environment is necessary to facilitate true R&D that can cope with socio-economic needs, and fundamental research on the researchers' initiative driven by their own intellectual curiosity.

Various research projects, in line with or in cooperation of each policy objective, are pivotal for upgrading science and technology in Japan. R&D at universities, national research institutes, and special public corporations, or in accordance with various R&D systems, should be effective and focused. Therefore, the government will expand any priority funds for promoting divers R&D, along with the expansion of the competitive funds above.

Fundamental research, where the independence of researchers play an important role, will produce vast intellectual assets. The government will expand the basic funds that researchers can spend continuously to guarantee such research.

(2) Constructing a Cooperation and Exchange System Beyond Sectors, Regions, and Nations

With requirements for science and technology growing and more diversified it is essential to join physical and intellectual resource scattered throughout sectors, regions and nations, in order to promote science and technology effectively and to put its achievements to full social and economic use. To construct a cooperation and exchange system, the government will implement the following comprehensive measures:

- To promote personnel exchanges beyond sectors by reforming relevant national systems and their operations so that researchers at national universities and national research institutes (hereinafter referred to as national researchers) can smoothly engage in research with or guidance to the private sector. Such exchanges provide opportunities for researchers to foster and demonstrate their creativity.
- To support and put into use academic societies, which play an important role in providing opportunities to evaluate researchers, publicize and exchange information, and promote personal contacts.

- To promote private sector use of research results by governmental circles. The government will streamline the handling of patents on research achievements done through official investments, so that firms engaged in research on behalf of the government may utilize the results. In this manner, the results can be transferred smoothly as the researchers transfer in and out, providing them with the incentive to do so.
- To implement measures to promote the actual use of research achievements by national universities and national research institutes.
- To construct large general-purpose facilities and to encourage their joint use with the private sector, the government will ensure that the national R&D infrastructure be also used by the private sector.

To promote cooperation and exchanges among industrial, academic, and governmental circles in regions based on the Basic Guidelines for Activating Science and Technology Activities in Regions (decided by the prime minister on December 13, 1995). Chiefly, the government will intensify support of public research institutes of local government, while welcoming their efforts to intensify R&D and technical support functions.

- To form an international R&D centers having a environment that attracts researchers in Japan and from abroad, aimed at promoting world-level R&D as well as international cooperation and exchanges.
- To promote international joint R&D and personnel exchanges including, “mega-science” (which refers to projects requiring international cooperation because very large or complex facilities and participation of researchers/engineers from a wide range of areas are necessary).
- To strengthen cooperation among relevant R&D institutions and administrative bodies in Japan and abroad, in order to promote “distributed mega-science” (which refers to mega-science requiring close

cooperation of prospective researchers, facilities, equipment, and information distributed over a wide range of geographical areas and science and technology fields) or to make it easier to acquire, accumulate, and send data on large-scale observations, research, and technology.

- To form R&D centers for distributed mega-science which accumulate an appropriate number of researchers and research equipment, and also have the function of sending and collecting research information.

To strategically promote fundamental research projects.

Such projects should be planned on the excellent idea of experts from industrial, academic, and governmental circles in Japan and abroad. The projects should be carried out with close cooperation among such experts using all their talents and information. Organization of the projects should have flexible structure with limited term. Here, it is advisable to fully utilize systems designed to promote the mobility of researchers and use of various funds. The projects are expected to rejuvenate research activities in R&D institutions.

(3) Impartial Evaluations

The evaluation system for institutions and subjects for R&D, should be radically review to activate R&D activities and to produce high results. An appropriate system should be established to conduct impartial evaluations in terms of objectives, duties, natures, conditions, scales, and periods. Setting standards for evaluations should also be fixed and it is important to include opinions of experts from outside when necessary. The perspectives of human studies should be fully incorporated with the idea that science and technology should harmonize with our lives, society and nature. As for large-scale, important projects, evaluations should be conducted by independent bodies. The results of the evaluations should be opened to the public. These results will be expected to effect the allocation of funds.

To facilitate such evaluations, the government will formulate basic evaluation guidelines to be commonly used on national R&D, with due respect to public opinion.

Researchers will be appropriately evaluated at their own institutes for effective R&D and fair remuneration.

As for universities, due respect will be given to their autonomy and other characteristics of research at colleges.

III. The Realization of a Desirable R&D Infrastructure

A researcher conducting research freely with state-of-the-art equipment in a quiet and comfortable office at a beautiful campus or R&D institution. Creating such an environment is a symbol towards promoting intellectual and cultural assets in the 21 century. This also sends an encouraging message to young people who will support science and technology in the coming generations.

It is vital to intensify the R&D infrastructure, such as facilities and equipment, if Japan is to promote original R&D and contribute to the advancement of science and technology throughout the world. With recent science and technology advancement, research equipment higher in quality and larger in scale appears each year. R&D institutions are required to cope with this trend.

Therefore, the government will:

- Renew facilities and equipment at universities and national research institutes which are overly superannuated or stored away after initial use.
- Strive to construct high-standard facilities with the most advanced equipment and for their proper maintenance.
- Upgrade R&D activities to cope with an advanced

information/communication-oriented society.

- Aim at publicizing the processes and results of R&D by: strengthening the information/communication infrastructure at each facility, expanding information networks among universities and national research institutes, and producing a database on science and technology.
- Promote the construction of a database on reference information covering researchers and research resources so as to be used for R&D activities, research planning, and evaluations.

To conduct R&D efficiently, it is necessary to: improve and standardize methods of tests, measurements, and researches, and maintain a stable supply, safety, and reliability of materials to be used as measurement standards, or for R&D, in terms of both quality and quantity. Therefore the government will intensify the intellectual infrastructure for R&D enhancing various measurement standards and evaluation methods for tests, and by facilitating the supply of research materials including genetic resources.

IV. Promotion of Learning About Science and Technology, and Formation of a National Consensus

The government will strive to: foster talented people who are creative and independent and who have dreams and the passion for science and technology; and to create an environment in which the public can feel close to, and have an interest in, science and technology. Based on the Basic Guidelines for Securing Science and Technology-oriented Personnel (decided on by the prime minister on December 27, 1994), the government will intensify the publication and education of science and technology by; enhancing science and technology education at elementary and secondary school, and holding various workshops for young people.

It is extremely regrettable that science and technology is believed to be difficult to understand and far from the public today, in light of the growing expectation on the role

and future of science and technology. Therefore, it is important to gain the public's deep and broad understanding for the promotion of science and technology with full respect towards harmony with humans, society, and nature. The government will implement measures to enhance public understanding and interest by, for example, providing relevant information and promoting public debates. It is also very important for researchers to provide easy-to-understand information on science and technology.

V. Expansion of R&D Investment by the Government

The Basic Policy for Science and Technology (decided on by the Cabinet on April 24, 1992) and the Social and Economic Plan for Structural Reforms - Towards a Vital Economy and Secure Life - (decided on by the Cabinet on December 1, 1995) recommend doubling R&D Investment by the Government as soon as possible. Achieving this target by the end of the term is desired with the idea of increasing investments to the level of major western nations by the early 21 century, in terms of its proportion to the GDP. In other words, it is necessary to raise total budget for science and technology to some 17 trillion yen by the year 2000.

On the other hand, Japan's budget deficit has deteriorated, even by major western nations' standards, raising fears that the financial deficit will have an unfavorable effect on the national economy and hamper its development. It is a highly urgent task to bring the national finance back on track for a healthy socio-economy in the 21 century.

In those points of view, the government will strive to expand budget necessary to carry out measures for this program in compiling the budget each year while paying full attention to the promotion of science and technology and taking into account future trend in society and the economy, as well as the current severe financial situation which shows no sign of improvement any time soon.

Especially the government will:

- Expand various types of research funds such as competitive funds, priority funds to

diversify R&D, basic funds, and funds to promote R&D through the private sector, in accordance with the basic aims of R&D promotion laid down by this program.

- Increase, funds to secure and foster researchers and to promote their exchanges and to intensify the R&D infrastructure, for creating a new R&D system.

In addition to those above, the government efficiently use all funds and secure sources of revenue by introducing private funds as well as the selling off of various assets.

CHAPTER 2 DEVELOPMENT OF COMPREHENSIVE AND SYSTEMATIC POLICIES

In accordance with the policies laid down in Chapter 1, the government will implement the following measures. These measures will be carried out based on various basic policies decided on by the prime minister. The government will revise these policies, when necessary, or even draft new basic policies for prior measures if so required.

I. Securing Researchers and Improvement of the R&D System

(1) Securing and Training Researchers and Supporting Staffs

The government will:

- Increase the number of graduate students based on: trends of scientific research social needs for manpower development; and demands for people who have completed graduate courses.
- Streamline professors' organizations and enhance facilities and equipment especially at graduate schools, in addition to making the best use of existing resources and upgrading the quality in education and studies.
- Promote flexible, open education and studies by utilizing a system of linked graduate school for cooperation between domestic and foreign R&D institutions
- Expand the number of students to be given scholarship loans by the Japan Scholarship Foundation, increase the amount of loans, and enhance its conditions so as to make it easier for top students to go on to graduate school.
- Further improve the conditions of JSPS (Japan Society for the Promotion of Science) fellowships for doctor course students.

- Further enhance: natural science and engineering education at universities, colleges of technology, and special training colleges; and vocational education at senior high schools. This can be achieved by improving study courses, reorganizing faculties and departments at universities to meet present demands, upgrading facilities and equipment, and introducing manpower from the private sector.
- Direct universities to be more open to working members of society so as to improve the quality of researchers and supporters.
- Achieve a program to support 10,000 postdoctorals by fiscal 2000, and undertake various other support measures to expand and nurture young researchers.
- Appropriately recognize postdoctorals, with the length of their research experience assessed on equal footing with that of full-time researchers.
- Prompt the industrial circle to improve the treatment to postdoctorals.
- Establish a postdoctoral system as a career path for researchers in Japan.

Revise relevant ordinances so that individuals with R&D abilities can be dispatched as temporary workers in response to the needs of R&D institutions in industrial, academic, and governmental circles, for smoothly securing talented people. This revision will be done under advise from the Central Employment Security Council.

Take measures to secure researchers and supporters at national universities/research institutes. These measures include improved treatment of personnel.

Secure and train capable research managers/leaders, provide female researchers/supporters with equal employment opportunities, and improve the working environment at national universities/research institutions.

Secure technical staff members systematically while promoting the organization of a research assistance department where necessary, and ensuring the appropriate treatment of staff members based on the substance and role of such assisting duties at national universities/research institutions. The abilities of the clerical staff will be improved through training while also streamlining clerical duties.

Extend efforts to gain the respect and understanding of the public regarding the importance of research assistance duties in Japan. Additional information on the substance and role of such duties in R&D will be provided through various public relations media. In addition, to intensify assistance systems at national universities/research institutes, the government will:

- a) Increase the number of supporters to match the number of researchers at national research institutes as soon as reasonably possible. To this end, the following measures will be taken to secure assistants and technicians: expanding the system to increase the number of supporters for prior research activities by utilizing talented people from outside; fully utilizing research expenses.
- b) Increase the number of supporters to match half the number of researchers at national universities immediately (the final goal is to match the number of researchers as in the case of U.K., Germany, and France). To this end, the following measures will be taken to secure new assistants and technicians: strengthening the system of hiring graduate students as research assistant; promoting the utilization of talented people from outside.

- c) Secure research supporters by fully utilizing contracts with private corporations, based on the supply and demand needs for such supporters at national universities/research institutes.

(2) Developing the R&D system

A fixed-term appointment system

- a)-1 The government will begin establishing a system of employing researchers to national research institutes on a fixed term with the following goals. The National Personnel Authority are going to asked to consider the personnel system as soon as possible.
 - i)-1 The progress and changes in R&D are dynamic today. It is necessary for each national research institute to smoothly attract talented people for research fields, which require the flexible flow of researchers. Even if no time frame has been set for a research program, the system should make it possible to employ researchers on a fixed term.
 - i)-2 The system should function as a gateway to success for young researchers, who nurtured their creativity with the desire of becoming top researchers.
 - ii) If researchers employed in this system are to work at profit-making companies after the expiration of their term, due consideration should be given to them.
 - iii) The system should realize an appropriate research environment with sufficient funds so that researchers can engage in efficient R&D during their term.
 - iv) The system should be put into practice based on the judgment of each national research institute.

- a)-2 In Japan, where the life-long employment system is common, it is important to secure talented people as researchers on a fixed term. The National Personnel Authority are going to be asked to consider the treatment including remuneration for such researchers at national research institutes. Equity and their duties would be also considered.
- b) As for professors at universities, a selectable fixed-term appointment system is now under consideration with relevant legislation in mind. Under this system, each university at its discretion can decide whether or not to introduce the fixed-term appointment system. This should be done to activate education and research through the mobility of personnel and to foster young educators/researchers through the various experiences. The government will reach a conclusion on such deliberation as soon as possible, and take all necessary measures based on the conclusion.

Utilizing manpower from outside

To activate research activities by fully utilizing manpower from outside, a special public corporation will employ capable senior researchers, and national research institutes will accept them for joint research. Another measure will be to secure personnel from private enterprises through contracts, to assist the activities of research leaders or other researchers in national research institutes.

Similar measures will also be implemented for universities.

Promoting cooperation and exchanges among industrial, academic, and governmental circles

a) Measures to promote human exchanges

In addition to completing and utilizing employment system with fix term as discussed above, the government will:

- Actively promote joint researches and manage them properly, with the hope of intensifying human exchanges. To this end, the government will further promote joint research activities between national research institutes and the private sector, and at the same time, for this purpose utilizing a leave of absence system for researchers of national research institutes.
- Further promote joint research between national universities and the private sector. the government will review relevant rules to, as an example, increase situations when joint research is conducted at private research institutions. If researchers are to participate in joint research activities conducted in the private sector on a leave of absence, whether or not the period of leave will be counted in the calculation of their retirement allowances will be of some concern for the researchers. Therefore, the government will consider this matter as soon as possible and handle it accordingly.
- Highly evaluate achievements of such cooperative research activities and provide industrial, academic, and governmental circles incentives to further cooperate by granting priority rights on the achievements.
- Further utilize the graduate school linking system to promote exchanges between national/public, private universities with national research institutes.
- National researchers' participation in research in the private sector not only contributes towards the promotion of science and technology in

Japan by cooperation among industrial, academic, and governmental circles, but also provides them with an opportunity to brush up and demonstrate their abilities. So the government will make efforts to apply flexibly the permission system on outside work by any public servants to national researchers, who engage in research or instruction during off-duty hours in the private sector. The government will take measures to clarify that if there is no particular interest such as approval and permission between a national researcher concerned and his or her temporary institution, nor any possibility of such relations, and if the performance of regular duties is not affected, relevant ministries and agencies may permit such “outside work”. The government views that it will be some time before the public allows a national researcher, as a public servant having obligations to give undivided attention to his or her regular duties, to participate in management activities in such areas as venture businesses.

- b) Promoting and facilitating participation in exchange activities of academic societies

The government will:

- Promote participation in and contribution to exchanges of academic societies as activities within the duties of national researchers, in order to encourage such exchanges. To this end, the government will take relevant measures necessary to facilitate researchers participation in their domestic academic societies.
- Consider expanding the exemption of the obligation to give undivided attention to individual duties, in the case where researchers of national research institutes participate in research gatherings. The objectives of this measure is to encourage national researchers to contribute in the holding and management of academic meetings and to actively

participate in such meetings.

c) Promotion of joint use of R&D facilities and equipment

As for R&D facilities and equipment for leading and advanced R&D activities at national universities/research institutes and special public corporations, it is highly important that these be used for joint researches by researchers of industrial, academic, and governmental circles, as well as from abroad. Therefore, the government will secure personnel to support the use by researchers from outside, and streamline procedures for joint use.

d) Promotion of cooperation and exchanges with the accumulation of R&D functions of industrial, academic, and governmental circles

To effectively promote cooperation and exchanges among the three circles, it is necessary to construct bases for research exchanges with dense accumulation of the R&D functions of the three circles. In this respect, the government will further develop based for R&D such as Tsukuba Science City, which has highly-accumulated state-of-the-art R&D functions in Japan, as such a base open to the world.

Flexible organization management and effective use of funds

The government will:

- Ensure that research organizations will be managed flexibly with the heads of research facilities having substantial leadership qualities. To this end, the government will expand the amount of research funds the heads may allocate at their own discretion and speed up and streamline clerical procedures necessary to administrate budget procedures at relevant ministries and agencies.

- Make the most of flex time system for greater efficient R&D.
- Promote the application of a flexible organization form that can be readily restructured at each research institution's own discretion, while utilizing researchers employed on a fixed term, as well as outside manpower.

(3) Various Evaluations

To produce impartial evaluations aimed at effective R&D, the government will:

- Create a framework to assess R&D subjects/institutions and researchers at each stage, as soon as possible.
- Draft, by the end of fiscal 1996, a basic guideline for appropriate evaluation to be commonly used for national R&D institutions so as to assess R&D subjects/institutions more effectively. The government will ensure that public opinions are reflected in the draft. As for universities, due respect will be given to their autonomy and other characteristics of research at colleges.

Evaluation of R&D subjects

At each stage, before (planning), during and after R&D, evaluation will be conducted on the validity of reasons, objectives, methods, and allocation of resources (including manpower and funds) according to the objectives, nature, conditions, scale, and period of R&D. Those conducting R&D will decide on when, by whom, and how (what items are assessed and what standards are to be used) the evaluation is conducted in light of the R&D objectives. It is important that the evaluation is effective, continual, flexible, objective, proper, and transparent. The results of the evaluation will be open to the public. These results will directly effect the allocation of funds.

As for large-scale R&D, outside experts will participate in the evaluation.

In the case of large-scale, important national projects such as mega-science,

evaluation will be conducted at each stage, before, during, and after a project, by an independent body. Such evaluation would include the assessment of economical efficiency. The results will be taken into account in selecting a R&D subject and in deciding whether or not to continue a project.

Evaluation of R&D institutions

National research institutions will be evaluated for the purpose of creating conditions to maximize their research abilities, and to produce satisfactory research results. To this end, regular evaluations will be conducted at each institution, or relevant ministries and agencies, and by seeking the opinions of outside experts. The objectives of the evaluation are: proper management of the organization and personnel; selection of R&D fields and subjects; construction and/or intensification of facilities/equipment, information infrastructure, and a research supporting system; promotion of exchanges including joint research; and overall better management.

Each research institution will decide on the specifics of the evaluation methods in light of its individual nature, then incorporate them into internal rules as well as taking other necessary measures. Outside experts for the evaluation will include prominent researchers from abroad, when necessary, with a view of upgrading the concerned institutions to the international level and to maintain their quality.

The results of the evaluation will be open to the public.

Universities will also improve their evaluation systems. Such improvement will include consideration on introducing evaluation by outside experts, while respecting its autonomy as well as other

characteristics of research at colleges. Universities will endeavor to make public its result.

Evaluation of researchers

As for researchers who are government officials, their achievements are presently evaluated at their own R&D institutions or relevant ministries and agencies. It is important that such evaluation be conducted properly, according to the purpose and nature of each institution, for effective R&D and appropriate treatment of personnel.

Nonetheless, with the rapid pace of specialization and subdivision, there are few experts who can appropriately evaluate, in particular, the achievements of advanced R&D. In institutions or departments conducting such R&D, internal evaluation is sometimes not enough. In this case, institutions will introduce evaluation by outside experts at their own discretion.

Special attention should be given to: R&D that is difficult to produce achievements in a short period of time in the form of theses or patents; and researchers who engage in relatively routine and continuous duties such as trial and assessment of safety, demonstration and instruction of technology, various observatory research, collection and use of genetic resources, and maintenance of measurement standards. It is necessary to apply different assessment indices other than just the number of theses or patents.

II. Developing and Improving the R&D Infrastructure

(1) Consolidating R&D facilities and equipment

Consolidating the facilities of national universities

Approximately 50% of facilities of national universities are 20 years old or more. In the revised building standards, the standard unit has increased 20% in order to lessen the small roomed situation in the buildings. To cope with this, it is necessary to systematically build or repair decrepit or small-roomed facilities.

At present, these facilities are estimated at around 12 million square meters in area. Moreover, it is necessary to create an environment that facilitates creative and innovative scientific research or international cooperation.

In light of this situation, the government will systematically renew facilities of national universities after proper survey and examination on when and how to build or repair these facilities.

The government will consider building facilities that can cope with future changes in research substance and organization structures, and that can also be used by research teams who have won competitive research funds. The government will also give attention to the safety of researchers and to any effects on the environment.

Consolidating the facilities of national research institutes

More than one-third of the facilities of national research institutes are 20 years old or more. Many of the institutes are located in the Tsukuba Science City. The majority of them were built between fiscal 1974 and

1979, and already many facilities require repair. At present, the total area of facilities of national research institutes that require rebuilding or repair are estimated at 800 thousands square meters. The government will renew these facilities after proper survey and examination on when and how to rebuild or repair them.

In addition, the government will take countermeasures to correct the small-roomed situation of them. Furthermore, the government will systematically upgrade the facilities to make it possible to conduct state of the R&D at international level, to prompt the industrial, academic, and governmental co-use or to promote international cooperation.

The government will smoothly complete the planned relocation of national research institutes, taking account of upgrading future R&D at these locations.

Consolidating the equipment at national universities/research institutes

In addition to renewing the equipment at national universities/research institutes, the government will increase expenditures to systematically consolidate a research environment in which state-of-the-art equipment that are always available. Equipment purchased ten years ago or more will be renewed as soon as possible. High intensive analyzing equipment will be shared among universities for effective use.

Consolidating facilities/equipment of private/public universities

The government will support consolidating research facilities/equipment of private universities by; increasing subsidies, and strengthening short and long-term loans by the Japan Private School Promotion Foundation. Other measures will include support for research projects with high social demand,

such as the high-tech research center program at private universities.

The government will also provide public universities with support for improving education/research conditions including additional subsidies for equipment.

(2) Promotion of the Information Infrastructure for R&D

To cope with an advanced information and telecommunication society and to upgrade R&D, the government will implement the following measures.

Constructing and strengthening the information/communications infrastructure at each R&D institution

The government will:

- Provide computers with information/communications functions for all national researchers engaged in research activities by fiscal 2000.
- Provide all national R&D institutions with Local Area Network (LAN), connecting the computers mentioned above.
- Further promote the introduction of asynchronous transfer mode (ATM) into campus LAN in all national universities.
- Introduce ATM into national research institutes where necessary.
- Cope with the demand for advanced information processing in R&D activities by: systematically introducing high-performance computers; systematically developing applications such as applied software and R&D supporting information system software.

Developing databases on science and technology

The government will:

- Prepare data, and develop databases on; literature including theses, and data

on various tests and observations steadily. These materials are the basis for science and technology activities.

- Assist national research institutes, universities, and academic societies/associations to develop databases on science and technology. To this effect, the government will: strengthen its support for developing databases on research information that begins in fiscal 1996, by Japan Science and Technology Corporation; expand the budget for the support of the development and maintenance of databases for researchers at universities; and intensify support by the National Center for Science Information System.
- Promote R&D for electronic library system and introduce the functions of electronic library into university libraries.
- Promote the development of databases on the guidance of information from various resources that can be used for R&D activities and planning, as well as drafting policies; make such databases available to researchers in Japan and from abroad.

Developing networks among R&D institutions

The government will:

- Promote the development of inter-institutional networks that connect computers and LAN to each R&D institution.
- Expand Inter-Ministerial Research Information Network that connect national research institutes into key networks with a national scale, as soon as possible, and upgrade the data transmitting speed of backbone lines to that in the United States (150 Mbps level, for the present time being) and extend efforts to increase the speed to the gigabit level where necessary.
- Upgrade the data transmitting speed of the Science Information Network (SINET) that connecting universities to the level of which in the United States (150 Mbps level, for the present time being) and extend efforts to increase the speed up to the gigabit level.

- Promote the development of networks among major universities using satellite communications.
- Further promote cooperation and interconnection among various research networks including the above-mentioned two networks; expand connection with the United States, Europe, and major Asian countries, and strengthen mutual access to various networks beyond the framework of industrial, academic, and governmental circles in Japan.

Others

Other measures will be implemented comprehensively and systematically based on the Basic Guideline decided by the Advanced Information and Telecommunications Society Promotion Headquarters of the Cabinet, and in line with the implementation guidelines of promoting information infrastructure for research and academic fields. Follow-up systems for those guidelines will be intensified.

(3) Improvement of the Intellectual Infrastructure

For the stable, efficient promotion of R&D activities, it is important to establish, collect, accumulate, and preserve; standards, test assessment methods, biological heredity resources, genetic resources, gene sources, and experimental materials. It is also important to make the above-mentioned standards and materials widely available through increased supply. Therefore, the government will:

- Substantially increase the number of measurement standard and reference materials types. The provision of measurement standards in Japan is far less than one tenth (1/10) of that in the United States.
- Establish various test assessment methods for standardization of test assessments, measurements, and research methods.
- Establish and strengthen systems to develop, collect, preserve, provide, and secure supply sources, safety, and reliability of: (i) genetic resources such as

plants, animals, microorganisms, forest trees, and aquatic organisms, (ii) gene sources such as DNA clone and cell collections, (iii) reference materials, (iv) chemical materials, (v) radioactive materials, (vi) protein, and (vii) data about these materials for research. The objective of this is to supply materials for research smoothly.

- Conduct R&D, at national research institutes, on methods for producing materials for research, and for analyzing/screening.

III. Expansion of Various Types of Funds

(1) Expansion of Competitive Funds

The government will provide researchers with a wide range of research expenses and the freedom to choose among them. Furthermore, expand competitive funds that contribute to the formation of a competitive research environment, thus increasing the proportion of competitive funds to the total amount of research funds. To this end, the government will substantially expand various competitive funds including: new funds for promoting basic research utilizing special public corporation, formally introduced in fiscal 1996; Grants-in-Aid for Scientific Researchers; Special Condition Funds For Science and Technology; expenses to promote R&D that invites public participation, including the private sector to utilize its skills; and expenses that each ministries and agencies, after selecting national research institutes, allocate among them to promote common R&D fields.

(2) Expansion of Priority Funds for Promoting Diverse R&D

The government will expand funds, with priority for promoting diverse R&D in accordance with the Basic aims of R&D promotion, in addition to the competitive funds mentioned above. The objectives are: to selectively strengthen basic science activities; and to selectively and effectively promote R&D conducted either by R&D institutes in universities, national research institutes, or special

public corporations, or by various R&D systems in response to socio-economic needs.

(3) Increase of Basic Funds

The government will increase expenses to manage R&D facilities/equipment and research funds that researchers can use on a regular basis, to steadily and effectively promote fundamental research activities where the independence of researchers of national universities/research institutes play an important role.

IV. Upgrading Research at Private Universities

Private universities play an important role in drawing out Japan's R&D potential. The students of Private Universities account for about 80% of all institutions of higher education and have many various researchers. Private universities are also conducting various characteristic education/research activities on their own concepts. Therefore, it is important for private universities to conduct various advanced research activities at their own discretion while positively promoting cooperation and exchanges with other institutions including private firms.

Consequently, the government will encourage private university researchers to participate in R&D activities conducted with expenses formally introduced in fiscal 1996, for a renewed promotion of basic research utilizing special public corporations, and with various competitive funds including Grants-in-Aid for Scientific Research. Furthermore, with a view at improving the research infrastructure and functions at private universities, the government will:

- Increase subsidies for research apparatus/equipment such as state-of-art apparatus at graduate schools, LAN within campuses, and information processing equipment.
- Expand subsidies for current expenditures to private institution of higher education to strengthen research functions and to selectively allocate them.
- Assist key research organizations; implement support programs such as high-tech

research centers program at private universities, thereby promoting research projects with high social demand.

- Lay the groundwork for promoting the introduction of various private funds into educational foundations.

V. Promotion of R&D by the Private Sector; Application of R&D Achievements by the Public Sector

(1) Promotion of Private Sector R&D

Private sector R&D expenses have not only leveled off, but their proportion to total sales recently decreased, a new phenomenon different from that in the previous stagnant economy.

For Japan to build a nation based on the creativity of science and technology, the private sector is indispensable. Because private sector R&D investment accounts for some 80% of all investment in R&D, private R&D activities are not only a dynamic force for cultivating economic frontiers but are expected to play an important role, in addition to the government, in furthering socially important R&D that serves public interests. Although it is basically self-benefiting efforts that cause the private sector to activate itself, in order to support their efforts, the government will:

- Utilize tax preference measures for the promotion of R&D activities, for example, the Tax Deduction on Experimental and Research Expense Increments that is designed to encourage, in general, private R&D.
- Extend support, notably in the form of subsidies, for: R&D that the private sector is unwilling to burden all the risks involved; socially important R&D that serves public interests; and R&D that contributes towards cultivating economic frontiers through new businesses by ambitious companies, especially small and medium-sized or key firms.
- Diversify funds to make it easier for small and medium-sized or key firms to raise money by: creating an environment in which intellectual property can be

used as collateral; improving the liquidity of the over-the-counter market; and expanding fund sources in the early stages, from starting a business to getting it off the ground.

- Strengthen the intellectual infrastructure to facilitate R&D activities by the private sector by: developing large-scale high cost facilities/equipment for joint use, and a research information infrastructure that goes beyond the private sector; expanding supply capacity for measurement standards and reference materials; and standardization of tests/assessment methods.
- Strengthen and protect intellectual property rights and strongly promote international harmonization in this area to create better conditions for the promotion of R&D.

(2) Application of R&D Achievements by the Public Sector

It is highly important to smoothly distribute R&D achievements from the public sector, in that it contributes to the activation of Japan's R&D and the creation of new industries. Therefore, while assuring the public benefit of national R&D achievement, the government will:

- Smoothly provide information that can be used by private R&D sector including information on the achievements in national research activities by developing databases, and by utilizing information networks, if they are needed.
- Streamline systems, i.e. the entire procedure from patent application to the establishment and maintenance of patents and others, so that national research achievements will be readily used by the private sector.

And implement greater measures to assist the private sector in its attempt to industrialize national research achievements that require time for results to materialize.

- Positively promote the transfer of national research achievements to the private sector. This can be made possible through: the promotion of joint research

among industrial, academic and governmental circles; and national researchers' active participation in technical instructions and joint research in private enterprises by utilizing a leave of absence system for joint research.

And extend efforts to provide joint research, or for R&D institutions that have conducted research on behalf of the government, with preferential rights on the use of patents and others from their research achievements. To this end, the government will review all relevant contracts.

With the expected mobility of researchers to grow in the future, in order to intend to pave the way for the use of research achievements by individual researchers, relevant ministries and agencies will revise, at their own discretion, office regulations and other regulations on inventions to introduce reverting patent licenses to individual researchers beginning in fiscal 1996.

VI. Promotion of International Cooperation

(1) Promotion of International Joint R&D through Japan's Initiative

- Intensify international cooperation with the emphasis on global issues including problems on population, food, resources, energy, environment, and infectious diseases.
- Positively and widely promote international joint research on basic science, which has intellectually creative activities for all people.
- Positively promote international joint R&D proposed and led by Japan, as with the case of the Human Frontier Science Program which Japan advocated at the economic summit.
- Work on mega-science projects including space science/technology and accelerator science through Japan's own initiative.
- Provide a boost for existing projects such as the International Space Station Program, International Tokamak Experimental Reactor (ITER) Program, the Large Hadron Collider (LHC) Program, and the Ocean Drilling Program

(ODP).

- Positively promote R&D in scientific fields on global environment, ocean science, information/communications, where international cooperative systems are being created for projects, driven by the growing need for such cooperation.
- Steadily promote international joint research in accordance with science and technology cooperation agreements.
- Establish a system to smoothly carry out international cooperation including international joint R&D.

(2) Expanding Cooperation in Science and Technology with Developing Countries

The government will;

- Enhance science and technology cooperation in both quality and quantity, on the principle that Japan extend assistance to developing countries' self-help efforts in such a manner as to flexibly and appropriately cope with the situations in each country.
- Ensure that researchers in Asia-Pacific countries take independent roles in joint R&D, because those countries have entered advanced stages where they are improving their own R&D abilities.
- Expand the exchange of researchers.
- Develop science/technology oriented human resources by accepting foreign students.
- Intensify cooperation in research information networks.
- Strengthen mutual use of research facilities.

(3) Creating a Better Environment for Strengthening International Activities in Science and Technology

To strengthen international science and technology activities, the government will;

- Improve the R&D/educational abilities of universities and nation research

institutions in Japan, and then form and develop international bases for R&D, especially Tsukuba Science City, as a center for exchanges of information and research throughout the world.

- Open Japan's research system to the world, promoting the appointment and acceptance of foreign researchers by:
 - (i) striving to accept the same number of foreign researchers as in all research offices in national research institutes.
 - (ii) expanding fellowship programs and other systems; namely, increasing the number of fellowships in the Postdoctoral Fellowships for Foreign Researchers of the JSPS from 420 at present to 1,050 by fiscal 2000, and raising the number of STA fellowships from 340 at present to about 1,000 by the 21st century.
 - (iii) enhancing Japanese language education, building/improving accommodations for foreigners, and providing opportunities for education and cultural activities for the families of foreign researchers.
 - (iv) systematically construction, as soon as possible, of accommodations for foreign researchers to be accepted by national research institutes, as a response to the expansion of the system for inviting long term foreign researchers.
 - (v) systematically build accommodations for national universities, as soon as possible, so as not to affect the research activities of long term foreign researchers that are growing in number.
- Expand the opportunities for dispatching Japanese researchers abroad. At national research institutes, it is hoped that the number of researchers to be dispatched for long term assignments are increased, and that the average researcher attends an international research conference at least once a year. In light of this, the government will expand such opportunities while paying attention to the effective and efficient use of all necessary expenses.
- Expand international exchange programs (which is indispensable for academic research at colleges) such as a fellowship program for Japanese scholars

and researchers to study abroad, travel grants to researchers attending international symposia held overseas, Grant-in-Aid for International Scientific Research, and JSPS program. Currently, about 10,000 university researchers are engaged in research activities abroad under such programs.

- Expand opportunities for dispatching researchers abroad under a new basic research promotion system utilizing special public corporations. The system has been formally introduced in fiscal 1996.
- Positively support national universities in inviting world-class researchers and holding international symposia to promote international exchanges on scientific information.

VII. Promotion of Science and Technology in Regions

Today, Japan is experiencing many drastic changes in its socio-economy, and regional communities are no exception. It is necessary that all regions extend efforts to activate themselves as cultivators of economic frontiers, for the realization of affluent local communities where people can coexist with nature and live rewarding lives.

Promotion of science and technology on the regional level is not only a driving force for activating local communities, as well as raising the standard of living for local people, but contributes to the advancement and diversification of Japan's overall science and technology. In light of this, while hoping that local public bodies take independent and unique actions to drive R&D activities, varying from region to region, it is important for the government to promote regional science and technology by positively supporting such activities, and by utilizing excellent local resources and all potential situations for R&D. The government will implement the following measures.

In promoting the advancement of R&D standards in regions, and R&D in accordance with the characteristics of regional communities, it is important to develop the manpower and to construct an infrastructure including any

required research facilities. Therefore, the government will intensify its support for better public awareness of science and technology, promoting basic and leading R&D, and constructing unique science/technology related facilities designed to deal with problems closely connected with local life and society.

In conducting basic and leading R&D based on the needs, characteristics, and natural conditions of the regions, and in promoting effective dissemination and practical use of all achievements, it is important to promote cooperation and exchanges among industrial, academic, and governmental circles. The government will: create/expand various research systems in which national and public universities/research institutions and private firms participate; and take measures to train and utilize R&D coordinators, and to intensify coordination at national universities/research institutions.

With the aim of strengthening the activities and functions of public research institutions, the government will intensify its support for:

- (i) R&D and technical assistance by public research institutes that lead to the development of regional industries
- (ii) creating cooperation among public research institutes in order to make (i) more effective and efficient.
- (iii) activating exchanges of people and information between public research institutes, and national/public universities and national public research institutes.
- (iv) improved training systems for researchers at public research institutes.

The government will move various functions of governmental R&D into regions in cooperation with local public bodies, in order to produce high-level research achievements through the use of top local resources and abilities for R&D.

VIII. Promotion of Learning and Understandings of, and Interests in Science and Technology

(1) Improvement of Science and Technology Education in School Education

- Expand opportunities for experiencing nature, and inquiring/practical activities such as observation, experiments, practice, and handicraft.
- Respect the individuality of each student with, for example, the use of team teaching.
- Improve the training of teachers in charge of science and technology education; positively utilize outside teaching staff.
- Supply adequate equipment for science experiments and practice, as soon as possible, based on the equipment standards for science education.
- Promote the introduction of educational computers by fiscal year 1999, a public elementary school will have 22 computers (two students per class computer), and a public lower secondary/upper secondary school will have 42 (one student per class computer).
- Conduct practical research in preparation for the introduction of Internet into a lot of schools education in the future.
- Develop and enrich educational software; promote the establishment of Educational Software Library Center across the nation.
- Promote the construction of science learning centers in each district unit in a specific area.
- Improve renew facilities/equipment for experiments and practice to promote industrial education based on the facilities/equipment standards for industrial education.
- Construct industrial education joint use facilities equipped with leading and advanced information devices and high-tech apparatus.
- Further improve methods to screen applicants for admission to senior high schools and colleges/universities by, for example, diversifying the means of selection in response to the features of the schools and the characteristics of specialized fields.

(2) Provision of Various Opportunities to be familiar with Science and Technology

In order to raise public interest in science and technology, especially for the young people, the government will:

- Promote the acceptance of senior high school students into universities, colleges of technology, and national research institutes to gain experience.
- Promote giving lectures and demonstration on experiments by professors/researchers at primary, junior, and senior high schools and others.
- Construct interesting science and other types of museums, enrich existing ones, and developing attractive programs for the purpose of: nurturing scientific ideas and perspectives among the youth for deeper understandings of natural sciences; and enhance the understanding on the important role science and technology played for the development of society and the economy.
- Enhance the quality of professional staff, such as art officials at museums.
- Strengthen support for the development of advanced science/technology experience centers by local public bodies.
- Take measures to intensify networks connecting science and other types of museums including those run by local public bodies and the private sector; design science and other museums to be more information oriented with multimedia technology.
- Aim to ensure the University of the Air through radio or TV is accessible from any part of the country.
- Promote the use of academic samples from national universities for the basis of R&D.
- Promote the construction of University Museum, which can effectively distribute academic samples as science and technology information.

(3) Promotion of Understandings of, and Interests in Science and Technology

The government will ensure that a national consensus on the promotion of science and technology receives wider and deeper support. The government will do so

in full consideration of: the harmony between science/technology and our lives/society with nature; and the harmonious development between natural and cultural science.

The government will implement greater measures to promote public understanding of, and interests in, science and technology. Such measures will include: nation wide dissemination, enlightenment and public relations; disclosure of research results; provision of necessary information; opening research facilities to the public; and provision of opportunities for discussions to raise public interest in science an technology.

Since public acceptance of science and technology is a common issue throughout the world, the government will promote strong international cooperation to tackle this problem.

On the part of researchers, when necessary, it is important to provide easy-to-understand information on R&D activities to obtain strong social support.