

**Executive Summary**  
**Proposal on “Science and Technology for a Safe and Secure Society”**

**Introduction**

The Tohoku Pacific Offshore Earthquake (Great East Japan Earthquake) gave rise to a giant tsunami and caused a serious accident at the Fukushima Daiichi Nuclear Power Plant, exposing the vulnerability of a Japanese society that lacked the ability to respond to crises. An example would be the fact that Japan was unable to utilize its achievements in advanced robotics and other areas, which had been developed based on the assumptive scenario of a major nuclear accident. Consequently, our country had no choice but to rely on the disaster response technologies of foreign countries, albeit temporarily. This was a grave experience for Japan, which had positioned itself as a technologically-oriented country. Reflecting on this experience, and amidst growing calls for a fundamental reconsideration of science and technology in relation to the paradigms of society, the Japan Science and Technology Agency has summarized this proposal based on numerous discussions (dating from April to December 2011) on the ideal role and position of science and technology in relation to social security within Japan’s society. More detailed contents of symposiums and hearing sessions from experts have been summarized in a separate volume.

In the course of its history, Japan has been placed at the mercy of natural disasters such as earthquakes, volcanic activity, and typhoons over and over again. For this reason, the country has developed an awareness of the important role played by science and technology in ensuring social security. However, a greater emphasis has been placed on enhancing and promoting advanced forms of science and technology, with correspondingly less little attention paid to the societal role of science and technology, such as in the area of crisis response. The 4th Science and Technology Basic Plan implemented in August last year placed greater focus on the societal role played by science and technology, as well as on the importance of innovation in science and technology.

Based on the wide range of opinions on risk and crisis collected from experts in various fields, it has become clear that even with the large number of outstanding research results we have amassed, research outcomes relating to social security are lacking in mechanisms for social implementation.

With regard to Japan’s response to the massive earthquake disaster and the nuclear accident, the specific problems that gained prominent attention were as follows:

- Despite the importance of collecting, analyzing, sharing, and communicating information, these processes did not function in many areas, including within the government, with serious flaws in regard to organizational operation.
- Although a chain of command with a strong sense of leadership is vital in responding swiftly and accurately to catastrophes, the chain of command did not function but instead gave rise to

confusion.

- Despite the need to adopt the knowledge and judgment of technical experts in the decision-making process, there was a lack of awareness of this need. There was an inadequate common understanding of the role of each decision-maker, such as experts, the government, and the power company.
- Even among experts, where views were split on controversial matters, many who aired their views through the mass media went to extremes in disseminating their own opinions, creating confusion and chaos among the public.
- Crises such as the massive earthquake and serious nuclear power plant accident had not been hypothesized as plausible scenarios. For this reason, practical response and training had not been carried out prior to the disaster.

This proposal was prepared to facilitate discussions to be held among the Council for Science and Technology Policy, the Division of Science and Technology Innovation Strategy (established after the restructuring of the aforementioned Council), and the science and technology community. Efforts have been made to raise issues at a wide range of levels in society, in view of the need to develop a common awareness on the role of science and technology among the broader society.

Close cooperation between the science and technology community and the central and local governments involved in the decision-making process will enable the results of research to be more effectively utilized in handling risks, crises, and catastrophes. However, this does not mean that the security of Japan's society can be assured simply through the efforts of the science and technology community.

Several issues facing Japanese society as a whole have emerged as a result of this massive earthquake and nuclear accident. These have been appended as reference materials. Furthermore, with regard to security, there is also a need to prepare society adequately against scenarios such as terrorism, war, or breakdowns of the financial system; however, these problems have been deliberately excluded from the scope of this proposal.

The terms used in this proposal, including "risk," "crisis," and "catastrophe" are defined as follows:

- Social security: Securing citizens' lives and property, the social infrastructure, and the health of corporate activities, as well as sustaining a society in which everyone can live securely.
- Science and technology community: The general term for scientific researchers and engineers, those who provide support for research in this field, and those who are involved in the formulation of policies relating to science and technology.
- Risks: Matters giving rise to the fear of danger, harm, or loss.
- Risk management: Reducing risks as well as preparing for crises and catastrophes.
- Crises: Dangerous situations, including the ongoing progress of such situations.
- Crisis response: Reducing damage and harm in the event of a crisis. Rescue, recovery, and

reconstruction.

- Catastrophes: Calamitous incidents or disasters which occur suddenly.
- Catastrophe response: Securing lives and reducing damage and harm in the event of a catastrophe. Rescue, recovery, and reconstruction.

## **Proposal**

### **1) Issues that should represent the central focus of the Innovation Strategy Council under the Council for Science and Technology Policy, and which should be tackled as soon as possible:**

- Establish science and technology for social security as one of the important pillars of innovation policy.
- Discuss the ideal situation of research and development, and of innovation, in relation to social security, gain a comprehensive understanding of risks, and establish systems for accurate response to risks (for instance, the establishment of subcommittees).
- Establish publicly-connected research and development programs for social security.
- Create a database of researchers and equipments supporting the government's comprehensive response to risks, crises, and catastrophes, and promote the widespread use of this database.
- Build up a network of firefighters, police, Japan Coast Guard, and self-defense forces that can be counted upon to respond at the frontline of a catastrophe, that share a common awareness of issues within this network, and that take measures to facilitate cooperation.

### **2) Issues that should be tackled in the medium term by the Division of Science and Technology Innovation Strategy:**

- Develop human resources with the necessary ability in the areas of management for risk, crises, and catastrophes.
- Conduct research on regional security that is rooted firmly in the region, and establish local strongholds for the development of human resources able to play an active role in the region.
- Establish an extremely mobile and dynamic new research institute in the areas of risk management and catastrophe response.
- Carry out reforms on the awareness of risks within the science and technology community.
- In order to respond to completely unknown risks, crises, and catastrophes and to secure social security, it is vital to ensure that there is diversity in knowledge within Japan. The government is strongly encouraged to strike a balance between problem-solving efforts and efforts to ensure diversity of knowledge.
- The science and technology community draws lessons from catastrophes and failures in a humble manner, and establishes flexible frameworks to incorporate these lessons at the academic and cultural levels.
- Promote measures aimed at enhancing the ethics of organizations and individuals engaged in the field of science and technology.
- In addition to clarifying the roles of the government and the science and technology community, construct a framework and routes that enable experts to provide advice for the government.
- Establish frameworks that can help to spin off into the private sector those science and technology achievements that play a useful role during catastrophes and crises.

- Review the roles of the Science Council of Japan (SCJ) and academic societies within the area of security, and guide them toward taking on roles such as serving as points of contact for foreign academies, etc.
- Take the necessary measures to provide adequate education on risks from the elementary stages.

### **3) Proposals for the science and technology community:**

- Change the view that academic papers alone serve as an index for assessing researchers, and consider social activities that contribute to risk analysis or to preventing and ameliorating crises or catastrophes as important elements in assessment.
- Reaffirm that diversity and succession of basic study are important for social security.
- Change the trend of placing excessive emphasis on efficiency and neglecting redundancy.
- Reaffirm the importance of ethics for engineers.
- Being proactive in providing advice for the governmental decision-making process is most desirable.
- Reaffirm the importance of an academic/sociological perspective in issues relating to social security.
- Not losing a sense of humility, and constantly assessing to detect overconfidence among individuals in the science and technology community with regard to scientific knowledge and technology.
- Introduce frameworks to check activities conducted by the science and technology community from a third-party standpoint.
- Take appropriate countermeasures against unfounded information circulating on the Internet.