

Repurposing of Advanced Technology for Enhancing National Security

Takashi Shiraishi
Takashi Saito
Kunizo Sakai

President, National Graduate Institute for Policy Studies
 Consultant, Hitachi, Ltd.
 President and CEO, Defense Systems Company, Hitachi, Ltd.*

With modern society facing a variety of threats to the safety and security of daily life, including natural disasters, physical and cyber terrorism, and energy problems, the concept of national security has taken on a wider meaning and has grown in importance. As Hitachi accelerates the global expansion of its Social Innovation Business that seeks to use information technology (IT) to supply advanced social infrastructure, it is also taking the security technology it has built up through many years of experience in the defense industry and applying it to the social infrastructure sector. Hitachi intends to contribute to the safety and security of social infrastructure through security solutions that are supported by highly reliable and advanced technology.

“Black Swans” and “National Security”

Sakai: Considering various recent developments in Japan and elsewhere, it seems as if the desire for safety and security is greater now than in the past. Debate on the subject of safety and security is particularly intense in Japan where the Great East Japan Earthquake (in March 2011) caused considerable damage to social infrastructure and continues to have a severe impact on the life of those affected. Mr. Shiraishi, could you please tell us how you view these developments.

Shiraishi: From 2010 to 2011, during the collation of the 4th Science and Technology Basic Plan of Japan, I chaired the committee producing the draft document. Safety and security were included among a number of different shared concerns during that time. While we lump safety and security together,

“safety” is something that can be expressed in scientific and probabilistic terms, whereas “security” (in the sense of “peace of mind”), because it is a question of feeling, is a matter in which there is scope for human judgment. I believe it is important to make this distinction.

Another term that has risen to prominence since the earthquake is “black swans.” While modern civilization is very advanced, it also incorporates a mix of complex technologies. Although there is no such thing as 100% safety, we acted as if such a thing were possible. This may be why the idea of black swans has achieved currency. The term can also be interpreted as meaning, not “unknown unknowns,” but rather, “known unknowns.” In other words, black swans are things that we might have foreseen if we had thought about it, but in fact we did not.

Sakai: That is a big difference.

* At the time of the interview.



Takashi Shiraishi

President, National Graduate Institute for Policy Studies

Graduated from the College of Arts and Sciences and completed a master's degree at the Graduate School of Arts and Sciences, both at The University of Tokyo. Completed a doctorate at the Cornell University Graduate School. After appointments that included professor at the Department of History at Cornell University and professor at the Center for Southeast Asian Studies at Kyoto University, he took up his current appointment in 2011. Professor emeritus at Kyoto University. President (non-executive) of the Institute of Developing Economies of the Japan External Trade Organization. Member (non-executive) of the Council for Science and Technology Policy. Doctor of History. Publications include “Government and Politics in Indonesia,” (Libroport) in Japanese.



Takashi Saito

Consultant, Hitachi, Ltd.

After graduating from the National Defense Academy of Japan, joined the Japan Maritime Self-Defense Force. His appointments have included Commanding Officer of the Hamashio and Setoshio submarines, Commander of Escort Division 22, Commandant of the Maizuru District and Yokosuka District, 27th Chief of Staff, JMSDF, and 2nd Chief of Staff, the Joint Staff. He was appointed to his current position in 2009.

Shiraishi: Preparing for both known and unknown unknowns in a way that takes full account of this difference, and being prepared to expect the unexpected, is the second of these shared concerns.

The third concern is national security. In the 4th Science and Technology Basic Plan, the section previously entitled “Key Technology of National Importance” was renamed “National Security and Key Technology,” this being the first time the term “anzen hoshō” (national security) was used in the Science and Technology Basic Plan. Against this background, defense and civilian technologies are not clearly demarcated fields as there is a need to consider dual use, and the term “national security” has expanded in meaning considerably over the more than 20 years since the end of the Cold War. I believe these are things we need to take into account.

Saito: That’s right. Speaking in terms of safety and security, while safety can be guaranteed in a probabilistic sense, trying to guarantee something like security that is a state of mind would likely turn out to be a never-ending task.

Shiraishi: It ultimately comes down to a question of cost. As with black swans, when one considers the uncertainties, many real-world phenomena follow a power distribution. The size and distribution of earthquakes is one example. This means there is a need to decide where to draw the line on the balance between costs and benefits because the cost of safety and security cannot expand indefinitely.

While where to draw this line in a way that receives public approval is a political question, I believe that we also need to determine the optimum cost of national security from a technological perspective.

Post-earthquake Leadership on Safety and Security

Sakai: Japan is an earthquake-prone country, and there is no doubt that structures that comply with Japanese safety standards are extremely robust. However, this makes them

more expensive. As products are increasingly rolled out in overseas markets, this may also result in their being over-specified in countries where earthquakes are less common. Specifications need to be changed to suit the circumstances in each country, and I believe it is also necessary to categorize them into different grades.

Saito: Deciding on the balance between achieving the objectives and respect for human life is an important facet of system design, including in the case of equipment and other products for the Japan Ministry of Defense. It was mentioned earlier that 100% reliability is unrealistic, and the trade-off between safety and cost will become an increasingly serious problem in the future, including from a technical perspective.

Shiraishi: Looking at international trends, meanwhile, there is a growing appreciation of the fact that protecting human life increases costs to some extent and it seems likely that the world will move toward Japanese standards over the long term. Japan is already well-known for the safety and punctuality of the Shinkansen, and one gets a sense that the world’s trust and expectations for Japanese nuclear power generation technology may have actually increased after the accident at the Fukushima Daiichi Nuclear Power Station. A considerable number of nuclear power plants are planned for construction around the world, particularly in emerging economies. Is it not Japan’s responsibility to the world to effectively incorporate the lessons from this accident into its safety measures and build nuclear power generation systems that are even more reliable?

Sakai: We live in an era when large disasters or accidents prompt global cooperation. Hitachi is active in the fields of disaster prevention management solutions, nuclear incident response, and nuclear security, and it may be that some forms of standardization or other rules will be needed, including in the field of national security.

Japan’s technology did not start out at the level it is today, and was achieved through a process of trial and error. It may be that taking a leading role in safety or security in the post-earthquake period will be our mission for the future.

Importance of Conducting Simulations

Sakai: The threat of terrorism is something that cannot be ignored when considering national security.

Shiraishi: After the 9/11 terrorist attacks in the USA, the US government conducted a variety of simulations of attacks on nuclear power plants and introduced new safety standards. While this is a government responsibility, I believe that ideas like this are also needed in Japan.

Saito: When something happens, I become acutely aware of how little use Japan makes of simulation. A fundamental problem is that Japan has comparatively few organizations involved in crisis management and information is often not shared because of their silo-like organizational structures.



Kunizo Sakai

President and CEO, Defense Systems Company, Hitachi, Ltd.

Joined Hitachi, Ltd. in 1975. His appointments have included Senior Manager of the Defense & Social Systems Design Department, General Manager of the Engineering Division, General Manager of the Command Control Systems Division, Defense Systems Group, Director of Hitachi Information & Control Systems, Inc. (now Hitachi Information & Control Solutions, Ltd.), and General Manager and CEO of Defense Systems Group. He was appointed to his current position in 2009.

Establishing these sorts of organizations and frameworks is crucial, but before that it is important that there are more opportunities for conducting simulations, even if only simple ones. Even if people understand in principle what they are meant to do, it does not mean that they will behave this way when a crisis actually strikes. Products supplied by Hitachi include equipment for the map-based exercises used to study tactics in the defense sector, and I believe that these could also be used as simulation tools.

Sakai: Equipment for map-based exercises supplied to the Japan Maritime Self-Defense Force Staff College has been in use for 17 years, and I understand it has recently been used for disaster response simulation.

The problem of silos may well apply not only to organizations but also to the spread of technology. Because there have been so many examples in which the use of computers and other technology outside their immediate fields (repurposing) has led to social progress, this idea is important.

The Type 92 floating bridge that we supplied to the Japan Ministry of Defense was utilized in the Great East Japan Earthquake, and Hitachi's anti-personnel landmine clearing machines are helping bring safety and security to conflict-torn regions. Hitachi's corporate credo is to contribute to society through technology, and in the security field as elsewhere, I believe we can offer even better systems through the repurposing of existing products, and through their integration with other technology.

Saito: Measures for countering cyber-terrorism are also important for the safety of social infrastructure. A recent cyber-attack by the hacker group Anonymous has attracted attention, and even before that, the safety of information has been under threat from cyber-attacks against companies and public agencies in Japan. What has the government been doing to about this?

Shiraishi: Awareness of the importance of cyber-security is growing within the government, particularly at the Japan Ministry of Defense and Cabinet Secretariat. Because cyber-security is a field that demands close cooperation between government and the private sector, transcending the military/civilian divide, I would like to encourage the government to expedite the establishment of structures and systems for cyber-security. As it is companies who possess the advanced technology in the information and communication technology (ICT) field, I am also looking to you for action.

Saito: With the greater fusion of information and control, there is pressure to adopt countermeasures, such as the identification of security vulnerabilities in the control systems of factory production machinery, for example. This is another area where simulation should prove effective, and I see a need for both the public and private sectors to utilize such techniques to strengthen risk awareness.

Sakai: Infrastructure control is one area that definitely needs

protection. We are working on technology developments that include cyber-security and encryption software, and in the case of cyber-security, I believe it is possible to deliver systems that protect what needs protecting at an appropriate cost by adjusting the level of security based on the importance of the data.

Utilization of Technology that Transcends Military/Civilian Divide

Shiraishi: Regarding the repurposing of technology that transcends the military/civilian divide, I also have hopes for satellite technology. Combining satellite imaging with geospatial information systems (GIS) is likely to prove valuable in activities such as disaster relief. Similarly, environmental and meteorological monitoring can help with disaster countermeasures, not only in Japan, but also in nearby Asian countries.

Sakai: Hitachi also develops solutions that contribute to forest and ecosystem conservation and the global environment by using satellite imaging to monitor illegal felling of forests, for example. We want to use satellite technology to pursue a variety of different forms of added value, such as its use in resource exploration.

Saito: To digress slightly from today's discussion, battery technology is growing in importance for defense products, particularly advanced personal equipment. This offers the potential for using civilian technology in defense, rather than the other way around, and in this sense it represents another opportunity for utilizing Hitachi technology.

Sakai: We are also conducting research into the long-term storage of energy with the aim of achieving a sustainable society. I believe that the way we need to proceed is to consider both the overall future direction for energy technology and also how batteries and other advanced technology can be applied in the defense sector.

Shiraishi: Because you are active in a wide range of businesses and technologies, my expectations for Hitachi extend across many different facets. I hope you can draw on your extensive strengths to also take a leading role in the national security sector.

Sakai: While the defense of social infrastructure has in the past considered different equipment separately, the modern post-9/11 and post-3/11 (Great East Japan Earthquake) era demands security that covers the infrastructure of society in its entirety. As Hitachi expands its Social Innovation Business globally, we hope to be able to utilize the national security technology we have built up through our defense business to respond to threats to the social infrastructure, such as natural disasters, physical and cyber-terrorism, and energy problems. We will continue to strive to develop and apply technology to help create a safe and secure society.

Thank you very much for your participation today.