

What is the Cross-ministerial Strategic Innovation Promotion Program?

The Cross-ministerial Strategic Innovation Promotion Program (SIP) is a national project for science, technology and innovation, spearheaded by the Council for Science, Technology and Innovation as it exercises its headquarters function to accomplish its role in leading science, technology and innovation beyond the framework of government ministries and traditional disciplines. The SIP has identified 10 themes that will address the most important social problems facing Japan, as well as contribute to the resurgence of the Japanese economy. Each project is led by an experienced and talented program director who is responsible for end-to-end focused research and development, facilitating coordination among government, industry, and academic entities. These directors have been charged with guiding their project from basic research to practical application and commercialization, and ultimately to a clear exit strategy. The SIP focuses on science, technology, and innovation, which drive our nation's economic growth and vitality and which will dramatically change society. Incidentally, projects related specifically to health and medical innovation fall under the direction of the Headquarters of Healthcare Policy.



Science, technology, and innovation are core drivers of Japan's economic resurgence and sustainable growth. The Council for Science, Technology and Innovation has, under the leadership of the Prime Minister of Japan and the Minister of State for Science and Technology Policy, promoted planning and coordination for comprehensive basic science, technology and innovation policies, taking a bird's eye view of Japan's entire science and

technology landscape. With the goal of strengthening its own headquarters function, the Council for Science, Technology and Innovation proposed three new policies: (1) Strategic formulation of overall governmental science and technology budget; (2) The Cross-ministerial Strategic Innovation Promotion Program (SIP); and (3) Impulsing Paradigm Change through Disruptive Technologies (ImPACT).


The Three Arrows to enhance the headquarters function of the Council for Science, Technology and Innovation

1

Strategic Formulation of Overall Governmental Science and Technology Budget

The Council for Science, Technology and Innovation leads the formulation of the overall governmental science and technology budget, beginning with the study of budget requests at relevant ministries, by utilizing such mechanisms as Action Plan for Science and Technology Priority Measures. The government has also adopted a new mechanism whereby the Council takes the lead in directing the prioritized allocations of the budget. (The Science and Technology Budgeting Strategy Committee has convened eight times, chaired by the Minister of State for Science and Technology Policy and attended by director-generals and their equivalents from related ministries.)

2



戦略的イノベーション創造プログラム
Cross-ministerial Strategic Innovation Promotion Program


The Council for Science, Technology and Innovation takes the lead in allocating budgets that cross the traditional framework of government ministries and disciplines. The Council promotes innovation along the entire path from basic research to effective exit strategies (practical application/commercialization), as well as taking on initiatives to reform regulations and systems.

Expenditures on Science, Technology, and Innovation Promotion

¥50 billion

Fiscal 2015 Budget
* Of this amount, 35 percent (¥17.5 billion) was allocated to medical fields

3



Impulsing Paradigm Change through Disruptive Technologies Program
IMPACT
革新的研究開発推進プログラム

Promotion of high-risk, high-impact research and development that could result in industry- and society-changing disruptive science, technology and innovation.

Fiscal 2013 Revised Budget

¥55 billion

(budgeted under the Ministry of Education, Culture, Sports, Science & Technology)

Features of the SIP Program

- ▶ The Council for Science, Technology and Innovation selects **projects that answer critical social needs and offer competitive advantage to Japanese industry and the economy.**
- ▶ **Cross-ministerial Initiatives.**
- ▶ **Promote focused, end-to-end research and development, from basic research to practical application and commercialization.** Utilize results in regulations, systems, special wards, government procurement, etc.
- ▶ **Intellectual property management system** facilitating strategic corporate use of research results.

Cross-ministerial Strategic Innovation Promotion Program (SIP)

5

What is the Cross-ministerial Strategic Innovation Promotion Program (SIP)?

The 10 Issues Addressed by SIP

The Cross-ministerial Strategic Innovation Promotion Program has identified 10 issues from the field of energy, next-generation infrastructure and regional resources to address social issues, to revitalize the Japanese economy, and to bolster Japan's industrial posture in the world.

Programs

Program Name	Program Overview	Fiscal 2015 Allocation	Funding (Management) Agencies/ Related Ministries
 Innovative Combustion Technology	Educate and train global top-class combustion researchers and build an industry-academy cooperative structure to improve internal combustion thermal efficiency up to a maximum of 50 percent, up from today's maximum of 40 percent. Contribute to improved energy savings, CO ₂ reduction, while at the same time building a stronger, more competitive Japanese automotive industry.	¥1.9 billion	Japan Science and Technology Agency (JST)
 Next-Generation Power Electronics	Power electronics use semiconductors to convert electricity from direct current to alternating current and vice-versa, as well as to control electrical voltage, current, and frequency. This program aims to use next-generation materials such as silicon carbide and gallium nitride to improve the performance develop new applications, and spread the adoption of power electronics for a leap forward in energy savings and a greater ability for Japanese industry to compete on the global stage.	¥2.19 billion	New Energy and Industrial Technology Development Organization (NEDO)
 Structural Materials for Innovation (SM⁴)	Accelerate the development of innovative lightweight, heat- and environment-resistant materials for Japan's aviation industry. Use the materials integration concept to reduce development time through advanced computer science and other technologies. Contribute to energy savings and CO ₂ reduction for dramatic advancements in Japan's component materials industry and major gains in Japan's aviation and electric power generation industries.	¥3.5 billion	Japan Science and Technology Agency (JST)
 Energy Carriers	Create a clean, economically secure society through electricity and hydrogen produced via renewable energy sources. Leverage advancements to market technologies on global markets. Forecast future technological innovations and energy costs that lead to a hydrogen-based, new-energy society. Develop technologies to create a hydrogen value chain.	¥3.04 billion	Japan Science and Technology Agency (JST)
 Next-Generation Technology for Ocean Resources Exploration	Exploit the wealth of potential resources in the Japan's maritime boundaries, which represent an area greater than 12 times the mass of Japan's dry land. Lead the world in developing efficient survey technologies to survey cobalt-rich manganese crusts, rare metals, and other hydrothermal ores, helping Japan overcome its resource deficiencies. Establish an industry-academy-government cooperative body to generate new efficient survey technologies for creating ocean resource survey industries.	¥5.7 billion	Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
 Automated Driving System	Set national goals to reduce the number of annual traffic fatalities to 2,500 or fewer by the year 2018 and create the world's safest road traffic environment by the year 2020. Develop automated driving systems, including next-generation urban transportation infrastructure, to accomplish these goals. Drastically reduce accidents and traffic congestion for a major leap forward in travel convenience.	¥2.32 billion	Cabinet Office, National Police Agency, Ministry of Internal Affairs and Communications, Ministry of Economy, Trade and Industry, Ministry of Land, Infrastructure, Transport and Tourism
 Infrastructure Maintenance, Renovation, and Management	A large portion of today's infrastructure was built during the period of our high economic growth several decades ago and in recent years numerous cases of infrastructure deterioration have surfaced, presenting the danger of devastating accidents and other serious related issues. This program will take advantage of world-leading information and robotics technologies to create systematized infrastructure management to restrain infrastructure lifecycle costs through preventive maintenance. The goal is to create sustainable maintenance industry and globalize the newly developed infrastructure management technologies.	¥3.27 billion	Ministry of Land, Infrastructure, Transport and Tourism, Japan Science and Technology Agency (JST), New Energy and Industrial Technology Development Organization (NEDO)
 Enhancement of Societal Resiliency against Natural Disasters	Developing a real-time data sharing system of information related to major earthquakes, tsunamis, heavy rains, tornado, and other natural disasters and utilizing the latest science and technologies, hence improving the capacity of disaster prevention and response in our society and citizens.	¥2.45 billion	Japan Science and Technology Agency (JST)
 Technologies for Creating Next-Generation Agriculture, Forestry and Fisheries	Create innovative production systems, new breeding and plant protection methods, and new functions for agricultural, forestry, and fishery goods and products, all supported by agriculture policies. Contribute to new agriculture careers and higher income for farmers and rural citizens. Improve quality of life, grow related industries, and contribute to solving the world's food problems.	¥3.32 billion	National Agriculture and Food Research Organization (NARO)
 Innovative Design/Manufacturing Technologies	Leverage regional business expertise and individual creativity for a more competitive industry stance, establishing new manufacturing methods that break current time and geographical constraints. Create regional innovation by developing new technologies allowing for high-added-value product design and manufacturing that quickly responds to the needs of businesses and consumers.	¥2.55 billion	New Energy and Industrial Technology Development Organization (NEDO)

Implementation Structure

A strong central headquarters structure is vital for effective coordination between ministries and among industry, academy, and government agencies. The Cross-ministerial Strategic Innovation Promotion Program has selected program directors to be responsible for each of the 10 individual programs making up this government initiative. Each program director has been selected for their proven leadership, which allows

them to effectively manage industry-academy-government coordination. The Cabinet Office set aside a budget of ¥50 billion shifting funds to various ministries on the path to creating this first-of-its kind breakthrough program. As a side note, programs related to the field of health and medicine are managed under the guidance of the Headquarters of Healthcare Policy.

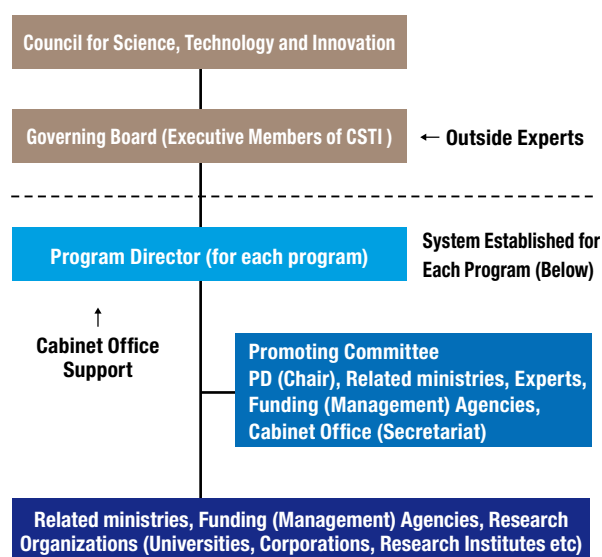
Implementation Structure

- ▶ Select directors for each program (PD)
- ▶ Program directors break through ministerial silos, managing programs from a cross-ministerial perspective.
- ▶ Governing Board (Members: Executive members of the Council for Science, Technology and Innovation) to provide advice/ assessment






Fiscal 2015 Budget






- ▶ Cabinet Office secured a budget of ¥50 billion for science, technology and innovation promotion expenditures included in the fiscal 2015 government budget bill.
- (Budget Flow) Cabinet Office → Ministries → (Funding (Management) Agencies →) Research Organizations

PDs selected by invitation from among top-class leaders in industry and academy



Program Director

Program Name	Program Director/Affiliation	Page
 Innovative Combustion Technology	Masanori Sugiyama Field General Manager, Engine Engineering Field Toyota Motor Corporation	10-13
 Next-Generation Power Electronics	Tatsuo Oomori Fellow, Corporate Research and Development Group Mitsubishi Electric Corporation	14-17
 Structural Materials for Innovation (SM ⁴)	Teruo Kishi Professor Emeritus, University of Tokyo Adviser, National Institute for Materials Science	18-21
 Energy Carriers	Shigeru Muraki Executive Advisor Tokyo Gas Co., Ltd.	22-25
 Next-Generation Technology for Ocean Resources Exploration	Tetsuro Urabe Professor Emeritus, University of Tokyo Executive Adviser, JMEC	26-29

Program Name	Program Director/Affiliation	Page
 Automated Driving System	Hiroyuki Watanabe Advisor Toyota Motor Corporation	30-33
 Infrastructure Maintenance, Renovation, and Management	Yoza Fujino Distinguished Professor, Institute of Advanced Sciences Yokohama National University	34-37
 Enhancement of Societal Resiliency against Natural Disasters	Masayoshi Nakashima Professor Disaster Prevention Research Institute Kyoto University	38-41
 Technologies for Creating Next-Generation Agriculture, Forestry and Fisheries	Takeshi Nishio Professor, Department of Clinical Plant Science, Faculty of Bioscience Hosei University	42-45
 Innovative Design/Manufacturing Technologies	Naoya Sasaki Corporate Chief Engineer, Research & Development Group Hitachi, Ltd.	46-49

What is the Cross-ministerial Strategic Innovation Promotion Program?

What is the Mission of the Governing Board?

The Governing Board is a steering committee that deliberates and considers basic SIP policies, researches and develops plans, allocates budgets, and conducts follow-up and other matters to ensure the progress of the SIP. The Governing Board plays a role in offering necessary advice and assessments of SIP and individual program research and development plans and

Background and Future Plans

Today, under the slogan of “the world’s most innovation-friendly country,” Japan is moving decisively to implement science, technology, and innovation policies. The Council for Science, Technology and Innovation established the Cross-ministerial Strategic Innovation Promotion Program as a central coordinating headquarters, based on the June 2013 Japan

progress. The results of Board assessments are reflected in annual SIP policy guidelines. Board members consist of individuals representing experts on the Council for Science, Technology and Innovation. The Board may bring in outside experts to offer assessments as deemed necessary.

Revitalization Strategy and Comprehensive Strategy on STI resolved by the Cabinet. The SIP was officially inaugurated in May 2014 with the selection of 10 individual programs, program directors, and a budget allocation for each program. In June 2015, Cyber-Security for Critical Infrastructure was approved as a new research issue candidate.

2013	
August	Request for budgetary appropriation (Science, Technology and Innovation promotion expenditures*1) from Cabinet Office budget reserve
September	Council for Science, Technology and Innovation selects 10 individual program candidates based on national/economic needs Establishment of Governing Board (comprised of the executive members of Council for Science, Technology and Innovation) to provide advice/assessments
October	Cabinet Office calls for Policy Advisors *2 for selected issues
December	Policy Advisors selected. Participants take the lead in drawing up research and development plans.
2014	
February	Public workshops
March	Pre-Assessments
April	Public comment period for research and development plans
May	Council for Science, Technology and Innovation decides issues, program directors, budget allocation

June	Program directors named, budget fund transferred to ministries, call for R&D institution participants
July	Deadline for participants, selection process begins (documentation, interviews)
August	Final determination of issues, R&D institutes; build R&D structure
October	Official launch of R&D activities
December	SIP Symposium 2014

2015	
February	2014 Year-end evaluations
April	2015 Initial budget allocation decisions
June	Council for Science, Technology and Innovation approves Cyber-Security for Critical Infrastructure as a new research program candidate. Call for Policy Advisor (program director candidate) for new research program candidate.
August	Policy Advisor selected.

*1 A total of ¥50 billion set aside in fiscal 2014 budget appropriation bill (35 percent (¥17.5 billion) allocated to medical field R&D as budget reserve funds)

*2 Part-time Cabinet Office staff. Program directors, after start of program.

New Research Program Candidate (As of October 15, 2015)

On June 18, 2015, the Council for Science, Technology and Innovation approved Cyber-Security for Critical Infrastructure as a new research issue candidate. On August 6, Professor Atsuhiko Goto of the Institute of Information Security was selected to serve as Policy Advisor.

Under this program, Japan will produce cyber-attack countermeasure policies to ensure the cybersecurity of our

critical infrastructure, conducting research and development into technologies for securing controllers and communications device security, as well as for monitoring performance, developing analysis technologies, and creating defensive technologies for controllers/communications devices and controller networks.

Our nation also aims to leverage this program to contribute to the stable operations of the 2020 Tokyo Olympics and Paralympics.



Cyber-Security for Critical Infrastructure

Program Director Candidate

Atsuhiko Goto

Dean and Professor,
Graduate School of Information Security,
Institute of Information Security

Comment

As the 2020 Olympic and Paralympic Games will be held in Tokyo, it is an urgent issue for our country to build strong cybersecurity measures for critical infrastructure systems. We also plan to leverage these cybersecurity measures to strengthen the industrial competitiveness of our nation. It is my goal to guide this new SIP project from basic research to practical application and social implementation, establishing strong cybersecurity technologies against cyber threats. To achieve these objectives, I intend to take quick and decisive action in leading this all-Japanese program.

Profile

Professor Atsuhiko Goto received his PhD from University of Tokyo in 1984. Upon graduation, he joined NTT, where he was assigned to the company’s information and communication technology R&D group, working for nearly 27 years in information technologies. In 2007, he was named head of the NTT Information Sharing Platform Laboratories, and subsequently named head of the NTT Cyber Space Laboratories in 2010. He has served in his present position since 2011. Professor Goto has various experiences in government-related work as well, serving as member or chair for various councils and committees for the Ministry of Economy, Trade and Industry and other government ministries.