



National
Science and Technology
Development Agency
Thailand



Message from President



Since 2006, NSTDA and the four national research centers -- National Center for Genetic Engineering and Biotechnology (BIOTEC), National Metals and Materials Center (MTEC), National Electronics and Computer Technology Center (NECTEC) and National Nanotechnology Center (NANOTEC) -- have synergistically shifted our operation from a sectoral focus to an integration of the R&D efforts. The new management theme is clusters based in response to the country's industrial development. The integrated operation of NSTDA's major clusters combined with the strengths of the four national technology centers, including an expertise in technology management of the Technology Management Center (TMC), is the driving force in the development of the four missions of NSTDA. They are (1) research, development, design and engineering, (2) human resources development in science and technology, (3) technology transfer and (4) development of infrastructure to strengthen the national clusters. In order to achieve this paradigm shift, NSTDA has applied the Balanced Scorecard technique as a performance gauge for an internal management.

In addition, the Competency Based Management (CBM) system is also used for personnel potential development. Therefore at all levels in NSTDA, staffs will be able to maximize their ability to develop their Science and Technology capacity for the nation.

I am confident that with all the forces of NSTDA, we will be able to push forward science and technology for the sustainable economic development and for the improved quality of life of all Thai citizens.

A handwritten signature in black ink, reading "Sakarindr Bhumiratana". The signature is fluid and cursive.

(Dr. Sakarindr Bhumiratana)

President

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NSTDA: A Driving Force for National Science and Technology Capacity

VISION

A key partner in developing a knowledge-based society through the application of science and technology

MISSION

Research and development to strengthen Thailand's sustainable competitiveness, complemented by technology transfer and the development of human resources and science and technology infrastructure, with outcomes that have positive impacts on society and the economy.



CORE VALUES

NSTDA embraces five core values as guiding principles to ensure performance excellence and efficient interaction within NSTDA.

NSTDA core values are:

- N = Nation First
- S = S & T Excellence
- T = Teamwork
- D = Deliverability
- A = Accountability



NSTDA In Brief

Building National Confidence in Science and Technology

Thailand's National Science and Technology Development Agency (NSTDA) was created by the Science and Technology Development Act of 1991 and officially commenced its operations in 1992. The Agency initially brought together three national technology centers: the National Center for Genetic Engineering and Biotechnology (BIOTEC), formed in 1983; the National Metal and Materials Technology Center (MTEC) and the National Electronics and Computer Technology Center (NECTEC), both formed in 1986. In 2003 NSTDA established the National Nanotechnology Center (NANOTEC), and in 2005 the Technology Management Center (TMC) was established as the fifth center under the NSTDA umbrella. NSTDA was founded with the explicit aim to "...conduct, support, coordinate, and promote efforts in scientific and technological development between the public and the private sectors towards maximizing benefit for national development...". NSTDA has served as a major base where leading scientists and experts can meet and work on scientific and technological issues of immediate concern to both the national and international communities. NSTDA is located at the world-class research facilities at the Thailand Science Park just north of Bangkok.

Governance

NSTDA operates autonomously with guidance and with the support of policies set by the National Science and Technology Development Board. This Board, which is appointed by the Cabinet, comprises 22 people equally appointed from the public sector and the private sector. It is chaired by the Minister of Science and Technology, with the Permanent Secretary of the Ministry of Science and Technology as the vice Chairman and NSTDA's President as the secretary.

NSTDA's also benchmarks its performance against international best practices with the help of an International Advisory Committee which is made of up of eminent scientists and science administrators from around the world.

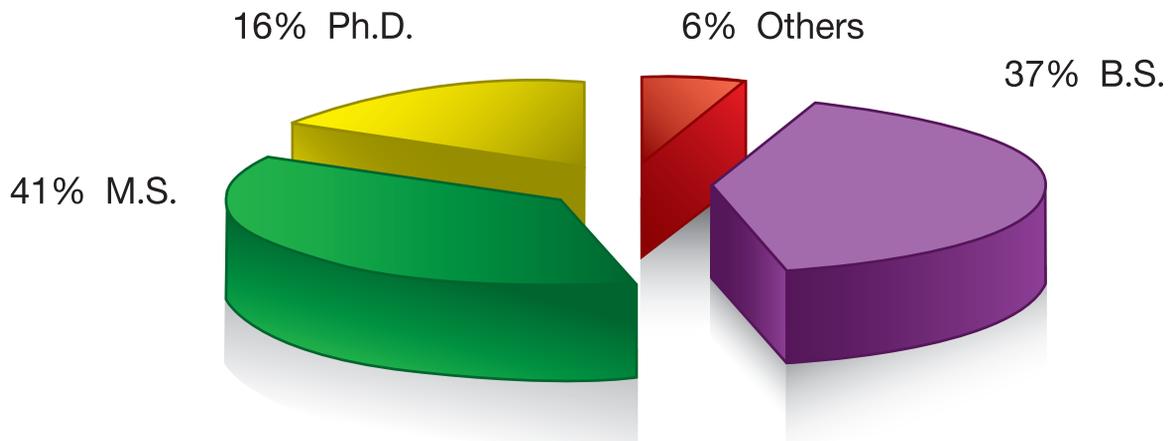


NSTDA by NUMBERS

Our Strongest Asset: NSTDA People

Total 2,518 employees

(as of December, 2008)



The Pride of NSTDA

745 articles published from (2000-2007)

172 NSTDA researchers received Thailand and international awards (2007-2008)

152 Patents registered in Thailand and overseas (1981-2007)



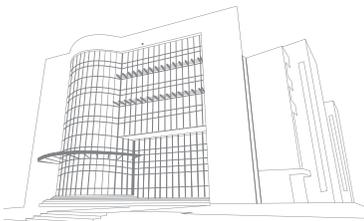
National Centers

The Right Mixture for A Head Start



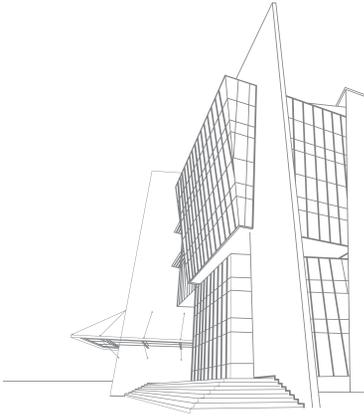
NSTDA Central Office

The Central Office houses the central administration of NSTDA, including the office of the NSTDA President, and also operates certain activities that cut across the boundaries of the national centers. It is effectively managed using such tools as quality management system ISO 9000, Strategic Planning Alliance (SPA) program, Thailand Quality Award (TQA).



BIOTEC: National Center for Genetic Engineering and Biotechnology

BIOTEC's main objective is to induce dynamism in research, development and application of biotechnology to support technology development, transfer and adoption in both public and private institutions. This is achieved through conducting R&D projects, human resources development, technical services, technology transfer, technology investment and public awareness. As a premier research institute in Thailand and Asia, BIOTEC operates three research units located at Thailand Science Park and nine specialized laboratories hosted by various universities. BIOTEC research covers a wide spectrum from agricultural science to biomedical science and environmental science. For more information, please visit <http://www.biotec.or.th>.



MTEC: National Metal and Materials Technology Center

The National Metal and Materials Technology Center (MTEC) aims to develop and strengthen technological capability in materials and related technologies including design and manufacturing in both the public and private sectors in order to propel and sustain industrial development, economic growth and environmental well-being of the nation.

MTEC has set three major objectives:

- To be the research center that supports and carries out research, development and information focused on metals and materials.
- To coordinate activities and foster collaborations among research units, educational institutions and industrial sectors both local and international.
- To offer academic services including training, analysis testing and production problem solving to customers.

For more information, please visit MTEC's website at: <http://www.mtec.or.th>.



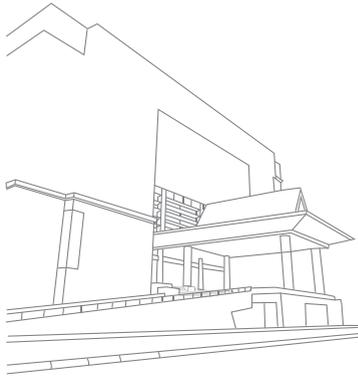
NECTEC: National Electronics and Computer Technology Center

NECTEC is a statutory government organization with its main responsibilities of undertaking, supporting and promoting the research and development of electronics and computer technologies. NECTEC provides a linkage between research communities and industries through the established industrial clusters and programmes. It also operates human resource development programmes for electronics and computer technologies and creates the physical infrastructure required to support technology development and relevant policies.

Furthermore, NECTEC is proud to be associated with the IT Projects under the initiatives of HRH Princess Maha Chakri Sirindhorn of which main objectives are to develop human resources and reduce poverty by means of education and skill development.

NECTEC's vision is set to be the leading organization in Thailand building partnership in R&D of electronic and computer technologies to strengthen capacity and sustainability of the nation's social and economic development.

For more information, please visit NECTEC 's website at <http://www.nectec.or.th>.



NANOTEC: National Nanotechnology Center

Responding to the fast growing development of nanotechnology and its applications to manufacturing technology in the 21st century, NANOTEC's objectives are to develop a nanotechnology roadmap for Thailand, to support R&D programs, to disseminate and transfer nanotechnology, to help develop advanced educational and training programs, and to promote technology investments. Given the prospect that nanotechnology solutions will greatly affect the everyday life of the Thai population, the establishment of NANOTEC firmly demonstrates Thailand's commitment to cutting-edge research and development to build a strong foundation for national competitiveness in the global marketplace and to improve S&T excellence. For more information, please visit <http://www.nanotec.or.th>.



TMC: Technology Management Center

TMC was established in 2005 with a mission to accelerate the development of knowledge-based industry in Thailand through a holistic and effective technology management system: firstly, by upgrading the technological capability of Thai SMEs through the provision of technical experts (Industrial Technology Assistance Program, ITAP), and commercialization of NSTDA 's intellectual property and other selected technologies, as well as financial assistance schemes; secondly, by expanding knowledge-based companies and entrepreneurs through the provision of financial assistance for technology development, R&D facilities in the Thailand Science Park, Software Park and incubators for nurturing start-up entrepreneurs. For more information, please visit <http://www.tmc.nstda.or.th>

Cluster-based Science and Technology Development

Inter-disciplinary Approach

Since its establishment in 1991, NSTDA has implemented and supported a wide range of programs and activities that have greatly enhanced the economic and social development of Thailand. These have been carried out through cooperation and networking with more than 30 universities, educational institutions, and government agencies, as well as with the business community.

In 2006, NSTDA introduced the cluster-based approach into its operations to enhance the impact of science and technology through closer cooperation among government, academia, and the private sector.

NSTDA seeks to enhance the competitiveness of Thai industry by supporting the technological development of a number of industrial clusters. Successful clustering will also be encouraged in other locations and in other industrial sectors throughout the nation. At NSTDA, industrial clusters are divided into eight areas: 1) food and agriculture; 2) medical and health; 3) software, microchip and electronics; 4) automotive; 5) renewable energy; 6) environment; 7) textiles; 8) rural community and the underprivileged; and 9) platform technology which includes basic research. This formation of clusters and clustering networks are not limited to Thailand alone as NSTDA pursues a clustering approach towards its international partners. The success of the clusters depends very much on the active involvement of both the National Centers as well as international partners.



Recent Accomplishments

The Present, The Potential and The Future



Food and Agriculture

To support the Thai Government's aim of developing Thailand into the "kitchen of the world", NSTDA works towards enhancing the competitiveness of Thai industries in food and agriculture by increasing value-add, improving the quality of raw materials, increasing the range of products, prolonging product shelf-life, improving the food processing and packaging process, and developing safety and quality standards. In these areas, NSTDA has both supported research in a number of Thai institutions as well as conducting its own in-house research, and these activities have led to a number of recent successes including decoding genetic code of the spirulina platensis (blue-green algae); developing diagnostic kits for yellow-head virus-YHV and white-spot syndrome virus in domesticated shrimp; developing disease-resistance plants, providing in-vitro fertilization and embryo transfer services to industry; using various bacteria and fungi for soil enhancement and developing biocontrol agents and industrial scale vulcanized latex.



Medical and Health

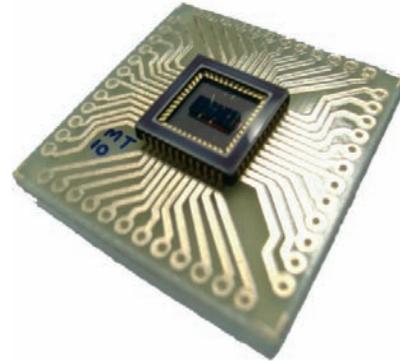
In collaboration with researchers from national medical schools, research institutes and national centers. NSTDA researchers are working diligently to improve the quality of life for Thai citizens through better public health innovation, particularly with regard to diseases endemic to the country such as Dengue fever, Leptospirosis, Thalassemia, Cholangio-Carcinoma, Melioidosis, AIDS, Avian Influenza, SARS and malaria. The focus of this cluster extends to translational research on diseases such as cancer, obesity and heart disease. Examples of achievements in the health care sector include the development of diagnostic test kits for SARS, hepatitis, severe diarrhea, Salmonella, dengue fever; drug discoveries assisting in the prevention of malaria; medical rapid prototyping; bio-materials; and IT for disabled persons.



Software, Microchips and Electronics

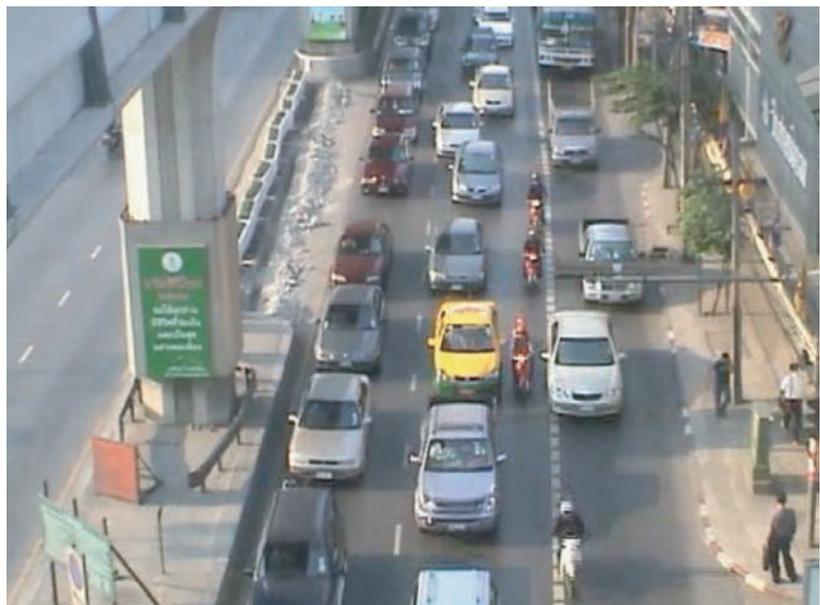
NSTDA's support for the Software, Microchips and Electronics cluster aims to enhance the competitiveness of local industries by increasing the local content of assembled product and developing the product design and capabilities. Designated flagships for this cluster are, for example:

- Software: Open source software developed by the Thais for Thai language application, is promoted to substitute for the imported proprietary software;
- Hard Disk Drive Program: R&D technologies focusing on Design and Simulation; Materials and Metrology; Automation; Electrostatic Discharge and Contamination;
- Radio Frequency Identification (RFID) technology: applications targeting for reducing the production cost, increasing the efficiency of warehouse production and transportation, and trading in high-value industries such as mass-communications, logistics and pharmaceuticals.



Automotive and Transportation

Apart from improved process and production design, development of better quality auto parts, research into alternative energy systems, NSTDA also incorporate the information, telecommunication, and computing technologies into a system that increases the effectiveness, quality, safety and convenience of the mobility of traffic and transportation. Training, and the provision of consultation services to local industry from NSTDA researchers are provided. Examples of achievement include 1) the control systems for fuel ignition; 2) the injection in natural gas engines and 3) traffic informationcenter (<http://traffic.thai.net>)



Renewable Energy

To reduce the dependency on fossil fuels and to introduce clean energy to the production process, the research programs under this cluster include the Solar Cells, and Biomass and Bio-Energy Research and Development.

The Solar Cells Program is developing a high efficiency thin film solar panels, a hybrid solar cell prototype which is better suited to the tropical climate, and an organic based solar cell. The research in Biogas and Bio-Energy helps increase the efficiency of waste water systems, lower electricity consumption, minimize odor, and reduce the use of polluting chemical treatments. Selected achievements are:

- The prototype of a hybrid solar cell production line: PECVD, PVD, pre heat, cool down, laser scriber, solar simulator etc.
- Hybrid Solar cell (a-si/mc-si)
- Photovoltaic/Thermal System : electricity generation and hot water production using solar cell
- Anaerobic wastewater treatment and biogas production technology for food industrial factory
- Steamless palm oil extraction system, production capacity of 1 ton oil palm fruit per hour



Environment

In response to the shortage of the world's natural resources and environmental deterioration, climate change, global warming resulted from rapid growth of population, economic development, the greenhouse effect, ozone losses, impoverishment of water resources and expansion of cultivated areas, NSTDA established the Environment Cluster in 2008. The scope of research in Environment cluster include :



- The natural resources management and utilization which focuses on rehabilitation and utilization of biological resources such as plants, herbs and microbes. Optimized and sustainable preservation and utilization of biological resources emphasizes on using microbes as a factory for the production of useful substances
- Remediation Technology focuses on polluted environment remediation by using bioremediation or phytoremediation technology, for example, to remediate salinity land in northeast of Thailand by using phytoremediation and adding organic compound into the target area.
- The production and use of environmental-friendly products and materials to support the export industry to meet the requirements of trade-partner countries.

Textiles

Thailand has had a long history of textile manufacturing, and currently produces 54,000 tons of textiles or 5% of the global textile industry with national income of 10% GDP from textiles and garment products exports. To help the industry remain competitive in the global market, NSTDA is working closely with the Thailand Textile Institute and textile companies to develop new textile innovations by means of technology transfer, R&D, well-trained manpower and strong collaboration networks between research centers, academics and industries.

NSTDA is currently funding and conducting research in the upstream and midstream areas of the textiles value chain. Utilizing the polymer technology, master batch technology and nanotechnology applications to textiles has led to the development of "functional yet fashionable" fabrics which demonstrate properties including anti-bacterial, anti-microbial, flame retardant, waterproofing and self-cleaning.



Rural Communities and the Underprivileged

This cluster aims to create communities that can integrate science and technology with local knowledge and practice. A part of the works has also been dedicated to youth in the area under a sub-program called "Science in Rural Schools- SiRS", launched under the initiative of Her Royal Highness Princess Maha Chakri Sirindhorn. The cluster also promotes R&D aiming to improve the quality of life of people with various forms of physical handicap and the elderly.

NECTEC also develop Rural Wireless Broadband Access (RWBA) project to develop wireless broadband communication system on Thailand's Internet Protocols (IPs). Its main objective is to reduce the digital divide problem and expand the Internet and telephone services to community and rural areas.



Human Resource Development

Nurturing the Young Talents and Cultivating the Pool of Experts

To cope with the growing demand for qualified human resources in science and technology, NSTDA has implemented a number of ambitious programs. More than 40,000 students and researchers have benefited from various NSTDA initiatives including:

- Scholarships at the Master's and Ph.D. level, both locally and overseas
- The Junior Science Talent project to groom the next generation of world-class scientists
- Mentoring programs for post-graduate students
- Short-term training for private sector personnel

NSTDA is also reaching out to Thai academics and professionals living overseas through the Reverse Brain Drain project. The networks being initiated by this project provide a platform for the development of researchers and professionals exchange, technology transfer, and the setting up of joint R&D and educational programs.

NSTDA proactively raises public awareness about the contribution that science and technology makes to society also as a means to stimulate curiosity in science, technology and innovation among the young. Significant examples include the Deutsches Elektronen Synchrotron (or called DESY Summer Student Program in Germany), the Junior Science Talent Project, the Permanent Science Camp Project, and the Thailand Advanced Institute of Science & Technology (TAIST). The youth can choose to participate in any activities, guided by their personal interests, preferences and skills.

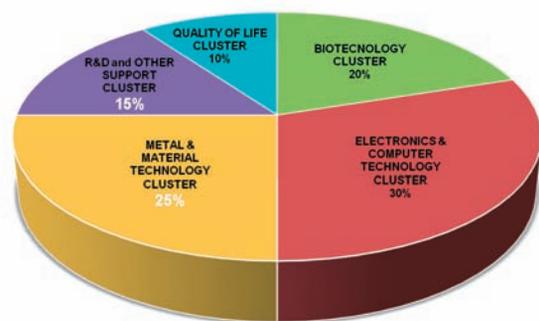


Infrastructure Development

Securing Knowledge-based Society with the State-of-the Art Infrastructure

As Thailand commits to emphasize the importance of science and technology in the private sector, appropriate mechanisms need to be developed and implemented which can facilitate among the business community, educational institutions, and research organizations. Accordingly, NSTDA has been assigned by the Government to manage:

Thailand Science Park (TSP) completed its first phase in 2002 and will complete its second phase in 2010. TSP facilities house the Central Office of NSTDA, the four national centers and the technology management center (TMC). TSP provides space for private sector in the form of incubators, multi-tenant buildings and long-term leased land. Thailand Science Park Incubator or TSP-I is a significant function to assist technology business start-up in their early stage. TSP-I provides effective comprehensive technology business incubation services, from pre-incubation to post incubation; to assist NSTDA spin-off researchers in their business endeavor; and to promote investment and funding of technology businesses. TSP-I brings in the strength of NSTDA in research & development over-10-years of experience to the private sector, so as to offer excellent incubation services amongst leaders in Southeast Asia. As in December 2008, more than 50 incubated clients are carrying out research activities in SP in close collaboration NSTDA.



Software Park Thailand (SWP) which aims to boost the capability of the Thai software industry. It presently houses 50 software companies and conducts numerous activities to promote and upgrade the software business in Thailand



The Sirindhorn Science Home (SSH) is the name graciously presented by Her Royal Highness Princess Sirindhorn to the permanent science camp. NSTDA will do its best to play an important role in HRH programs and projects to educate and support future generation of Thai scientists, technologists, engineers, and researchers. The major aim in creating this science home is to establish a one-stop learning center of science and technology that can provide sustainable and continuous opportunities to the youth of Thailand for learning and applying science and technology skills.

The grand opening of the Sirindhorn Science Home is graciously presided over by HRH Princess Sirindhorn in March 2009. Once the Home achieves full operation, there will be more than 3,500 students participating in science and technology learning activities annually.

The Thailand Science Park Convention Center (TSPCC) is a four-story 30,000 square meter building featuring a variety of world-class services and facilities such as small and medium-sized multipurpose conferencerooms, specialized computer training facilities, reception rooms, and convention halls for international conferences, special events and upscale exhibitions.

The Science & Technology Knowledge Service (STKS) is a web portal that acts as the gateway to digital knowledge of science and technology worldwide (www.stks.or.th). Full-text research papers from well-known data bases such as ScienceDirect, ProQuest, and IEEE are linked to the original web pages for free download. Over 4,000 web pages of illustrated e-knowledge in natural and applied science & technology are also available.



Science and Technology Services

Commercialization of Research and Development

The Industrial Technical Assistance Program (ITAP) provides a range of technical and business oriented consultancy services to support the growth of Thai small and medium enterprises (SMEs). Currently, there are more than 1,600 entrepreneurs that participate in this program. The service includes grants and loans, technical consultation on improving product quality and production efficiency, minimizing waste, software development, the use of information and mobile applications and innovation management.



Technology Licensing: NSTDA's Technology Licensing Office (TLO) manages the intellectual property of NSTDA's National Centers, and the Technology Management Center foster commercial investment in these intellectual properties through licensing agreements. NSTDA's TLO provides patent databases of NSTDA and alliances for business applications, arranges contracts for technology licensing, and provides consultation and training in technology licensing to the public and private sectors.



Research and Development Project Certification: companies that carry out R&D activities are eligible to apply tax deduction via double deduction of R&D expenditure as per government policy to enhance research and development capacity.



Testing Services: NSTDA laboratories also provide DNA technology, EMI/EMC testing, product testing, material analysis, bio-service, and calibration to the public and private sectors.

International Cooperation

World's Partnership in the Way Forward

Science and Technology is a global activity. NSTDA is working diligently to raise its profile in the international scientific community, and to build research partnerships with leading research agencies and educational institutions across the globe. These linkages help NSTDA researchers benchmark their work against the best research being done in the world today, and the networks formed support the international flow of technology and people.

NSTDA has established, and is maintaining bilateral and multilateral relationships with a wide range of agencies and institutions, and many of these relationships are supported by official agreements. NSTDA has collaborated with the agencies and institutes overseas.

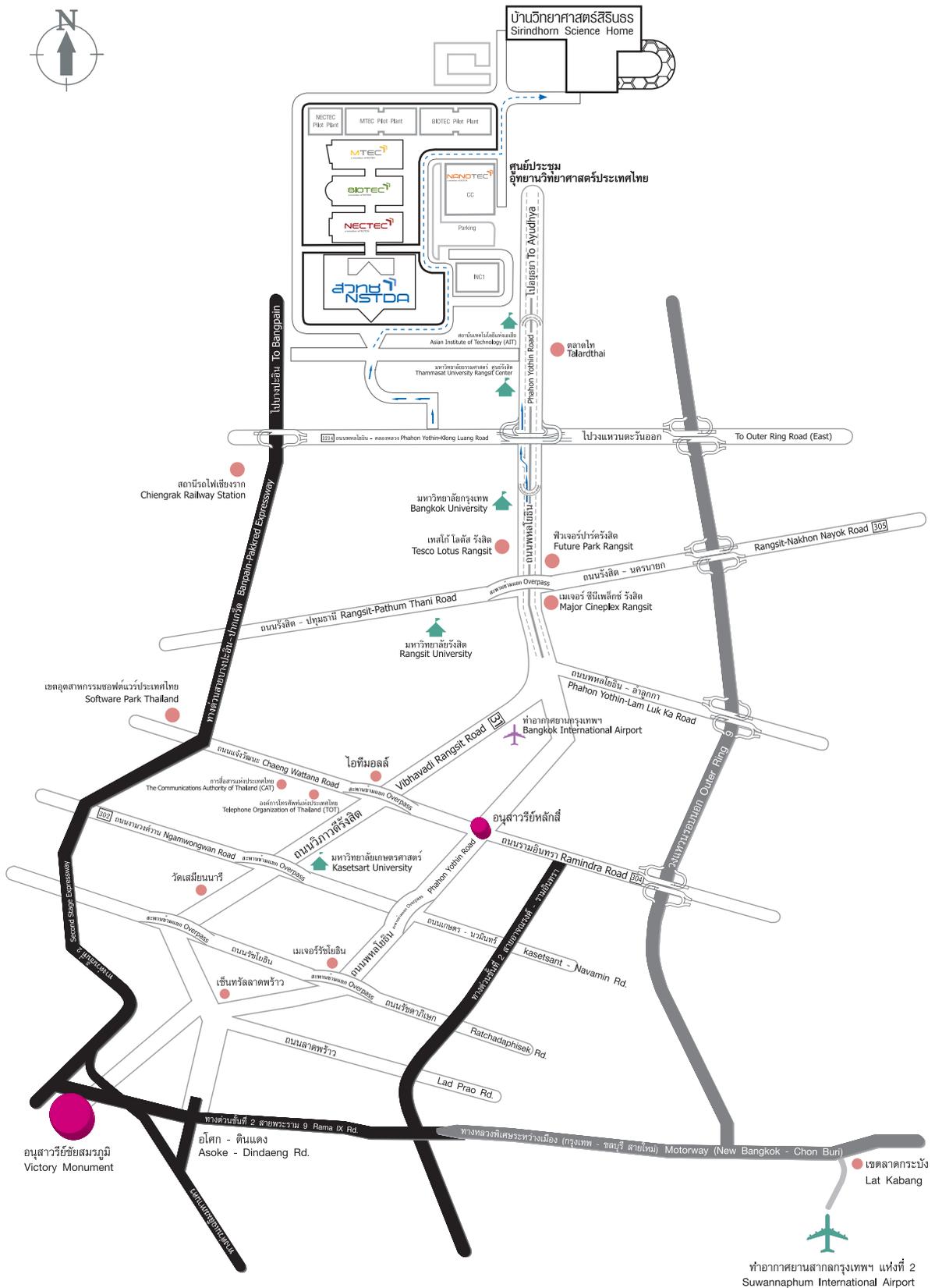
Multilateral collaborations:

- APEC Industrial Science and Technology Working Group (ISTWG)
- ASEAN Committee on Science and Technology (COST)
- ASEAN Foundation
- European Union through the FP7 program
- United Nations Educational, Scientific and Cultural Organization (UNESCO)
- United Nations Industrial Development Organization (UNIDO)
- United Nations Conference on Trade and Development (UNCTAD)
- United States Trade and Development Agency (USTDA)

Bilateral collaborations:

- | | |
|--------------|--------------------|
| 1) Australia | 11) Korea |
| 2) Belgium | 12) Lao PDR |
| 3) Canada | 13) Malaysia |
| 4) China | 14) Russia |
| 5) France | 15) Switzerland |
| 6) Germany | 16) Taiwan |
| 7) India | 17) United Kingdom |
| 8) Italy | 18) United States |
| 9) Israel | 19) Vietnam |
| 10) Japan | 20) Singapore |





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