Annual Report 2016

Defence Technology Institute
(Public Organization) Ministry of Defence, the Kingdom of Thailand


Achievement-oriented
Teamwork
Integrity
Customer satisfaction
Continuous improvement
National Interest First

Annual Report
2016

Defence Technology Institute (Public Organization)
Ministry of Defence, the Kingdom of Thailand

CONTENT

Massage from General Prawit Wongsuwan, the Minister of Defence

Defence technology is one of fields in research and development that has been supported and pushed by the Ministry of Defence to focus on the integration of compatibility on the public, private and educational education entities in the aspect of knowledge, personnel, and resources for maximum benefits.

The Defence Technology Institute (Public Organization) or DTI is a government agency that can continuously link research to cooperation in actual production to effectively achieve efficiency and we would like to thank the committee, management and all the staff for their dedication to creating concrete performances and tangible results throughout the 8-year period.

On this auspicious occasion, may all the sacred things in the universe and the blessing of His Majesty King Maha Vajiralongkorn Bodindradebayavarangkun bless DTI officers and their families happiness and good health for the prosperous future.

General

(Prawit Wongsuwon)

Minister of Defence

Message from the Chairman of the Board of Directors

Let us all pray together according to the religion that you respect as we have saluted and invoked the sacred respect for every person to pray for His Majesty the Late King Bhumibol Adulyadej to protect the Kingdom of Thailand, the people of Thailand, and the King's subjects as we request for peace and tranquility under the 70-year reign and would like to salute His Majesty King Maha Vajiralongkorn Bodindradebayavarangkun, long live the King.

In 2016, Defence Technology Institute (Public Organization) or the DTI has conducted research and development as well as the preparation of an updated strategic plan in accordance with government policies and remains committed to cooperate with all the parties involved in the defence industry to jointly push for a greater concrete implementation.

The government has been focusing on developing a strategic plan for the period of 20 years since Thailand still have had no long-term vision for the country's development in the 15-20 years ahead. There are only government policies for the period of 4 years and the 5-year national social and economic development plan. The national social and economic development plan of each government lacks a coherent security. Therefore, the government, the private sector and individuals do not know the ultimate goal of the country, so the implementation of the various sectors lacks the coordination and cooperation to lead them in the same direction. It is crucial to have a clear vision and strategies.

DTI is working on improving the strategic plan to strengthen the technological goal of 8 branches to be in comply with the long-term national strategic plan for 20 years between 2017-2036, the national economic and social development plan no. 12 (2017-2021), the national security policy, the Minister of Defence policy, national defence strategy, the Ministry of Defence, the Ministry of Defence capacity development plans, and strategic development of the defense industry.

DTI will continue to strive to meet the expectations and take action to support the missions of the Arm forces, the private sector and educational institutions to achieve self-sufficiency for the defence industry. I am confident that DTI will continue to progress due to our sustainable commitment and cooperation.

Air Chief Marshal

(Pongsatorn Buasup)

Chairman of the Board of Directors,

Defence Technology Institute


DTI

Message from the Director

His Majesty the late King Bhumibol Adulyadej (Somdet Phra Poraminthra Maha Bhumibol Adulyadej) had performed his duties for the well-being, quality of life of the Thai people and the sustainable prosperity of the nation. We would like to thank you Him for His kindness. We also would like to salute His Majesty King Maha Vajiralongkorn, Long live the King.

His Majesty the late King Bhumibol Adulyadej thanked the US Congress on June 2, 1960 by stating that "the aid of the United States of America leads to Thailand's achieving its objectives with its own effort... One day, Thai people will be able to do it themselves, and not having to rely on your help." It is regarded as a guide for DTI to adhere to in supporting the armed forces' missions in the national defence industry.

One of the DTI research and development projects in 2016 that can be deployed on a mission to help the people is the weather modification rocket project, which is used to support the mission of the Department of Royal Rainmaking and Agricultural Aviation. This is the pride of DTI to be able to further knowledge in the production of rockets used to support the royal initiative.

In addition to the weather modification rocket project, there are also other projects that DTI has been performing continuously in 2016 such as the research and the development of DTI-1G, multiple launch missile systems, research and development of DTI-2, high capabilities missile testing range development, research and development of the basic elements of unmanned aircraft systems, research and development of centralized information system technology, and applications, research and development of armored vehicles for the Marine missions, research and development of weapons systems remote control, research and development of multi-barreled rocket missile with the shooting distance of 80 km, research and development of a prototype of an explosive disposal robot, research and development of cost saving firing range projects, and research and development of 30 mm ammunition into the production line project. The 30 mm ammunition project was a pilot project integrating research, development, and defense industry, conducted in partnership with the private sector according to the government policy on achieving integration in the operation for the budget to yield maximum benefits.

2016 was the year that the government has given priority to the research and development of the country as stated by the head of the National Council for Peace and Order No. 62/2559 on the reform of the country's research and innovation that focuses on the integration of research and innovation to meet the needs of the country and in the same direction to reduce duplication and push for the adoption to yield concrete benefits.

General

(Sompong Mukdaskul)

Director-General, Defence Technology Institute

Vision

To be the regional leader in selected defence technology offering solutions to the Royal Thai Armed Forces and ASEAN alliances

Mission

1. Research and develop major defence equipment and system that the Defence Council requires and has approved of a master plan.
2. Study, analyse, research and carry out tasks related to or in line with defence technology development.
3. Be a defence technology knowledge centre for Ministry of Defence in order to advice on policies and plans to the Minister in defence science and technology development.
4. Coordinate and cooperate in the field of defence technology with other government agencies, related academic institutes and private sectors, both domestically and internationally.
5. Promote and support trainings, researches and human resources developments in the field of defence technology.
6. Be a centre in providing data and information in the field of defence technology and promote academic activities to transfer appropriate defence technology to the civil society.

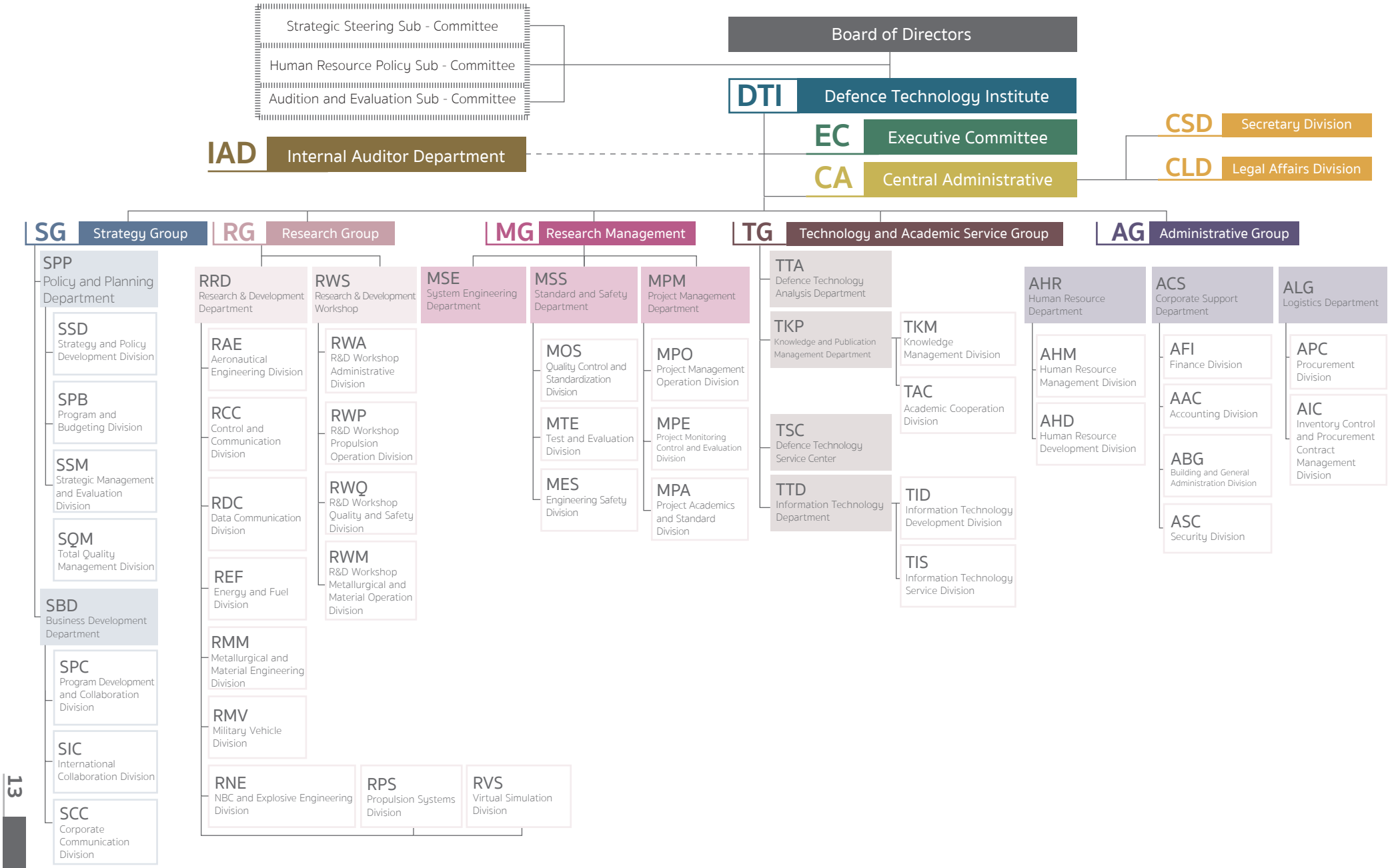
Core Values

- Achievement-oriented
- Teamwork
- Integrity
- Customer satisfaction
- Continuous improvement
- National interest First

Core Purpose

Research and development of materiel using advance technologies leading toward strong defence industry for sustainable and self-reliance in national security

Organization Chart



Board of Directors

1. **Air Chief Marshal Pongsatorn Buasup**
   Chairman of the Board of Directors
2. **General Preecha Chan-ocha**
   Member of the Board of Directors
   (Permanent Secretary for Defence)
3. **General Surapong Suwana-Adth**
   Member of the Board of Directors
   (Chief of Joint Staff)
4. **General Pisit Sitthisarn**
   Member of the Board of Directors
   (Chief of Staff, Royal Thai Army)
5. **Admiral Pallop Tamisanon**
   Member of the Board of Directors
   (Chief of Staff, Royal Thai Navy)
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Expert Member of the Board (Accounting, Finance and Budget)

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Member of the Board of Directors and Secretary
(Director-General of Defence Technology Institute)

Sub - Committees

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Mr. Siriphong Athan-uta	Member
Mr. Pongart Trikitwattanakul	Member
Director-General of Defence Technology Institute	Member
Deputy Director-General of Defence Technology Institute (Administrative Group)	Member
Director of Human Resource Department	Secretary
Director of Human Resource Management Division	Assistant Secretary
Director of Human Resource Development Division	Assistant Secretary

Audit and Evaluation Sub-Committee

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Asst. Prof. Pongwit Siribhodi	Member
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Director-General of Defence Industry and Energy Department	Member
Director-General of Defence Science and Technology Department	Member
Director-General of Defence Technology Institute	Member
Deputy Director-General of Defence Technology Institute (Strategy Group)	Secretary
Director of Policy and planning Department, Defence Technology Institute	Assistant Secretary

Executive Committee

Director-General of Defence Technology Institute	Committee Chairman
Deputy Director-General of Defence Technology Institute (Strategy Group)	Deputy Chairman of Committee
Duputy Director-General of Defence Technology Institute (Research Group)	Deputy Chairman of Committee
Duputy Director-General of Defence Technology Institute (Research Managrment Group)	Deputy Chairman of Committee
Deputy Director-General of Defence Technology Institute (Technology and Academic Services Group)	Deputy Chairman of Committee
Deputy Director-General of Defence Technology Institute (Administrative Group)	Deputy Chairman of Committee
Director of Policy and planning Department	Committee
Director of Business Development Department	Committee
Director of Research and Development Department	Committee
Director of Research and Development Workshop	Committee
Director of System Engineering Department	Committee
Director of Standard and Safety Department	Committee
Director of Project Management Department	Committee
Director of Defence Technology Analysis Department	Committee
Director of Knowledge and Publication Management Department	Committee
Director of Defence Technology Service Center	Committee
Director of Information Technology Department	Committee
Director of Human Resource Department	Committee
Director of Corporate Support Department	Committee
Director of Procurement Department	Committee

Executive Summary

This is the 8th year that the Defense Technology Institute (Public Organization) under the supervision of the Minister of Defence has conducted research in defence technology development to enhance the military self-reliant capability and strengthen the nation defence industry.

The government has been focusing on improving national strategies, policies and laws to drive national research and development to be concrete. The DTI has applied the policies of the government and Minister of Defence to consistently improve the strategy, goals, and indicators of the Defence Technology Institute. This includes upgrading the royal decree on the establishment of DTI to improve the objective and increase the authority and benefits to support and drive the defence industry to result in greater concrete integration of the government sector and private sector.

In addition to the ongoing projects implemented by DTI, the modified aircraft rocket project with the prototype developed as a modified rocket propulsion system and tests conducted to verify the design results is one of the projects that DTI is proud of. This project was integrated with the Department of Royal Rainmaking and Agricultural Aviation. This project has been used to support the royal rainmaking project. This is to further build on the knowledge of rocket production to support the royal initiative project.

DTI continues to strive for the quality of DTI research and development to be seen and appreciated by users. These tasks cannot be achieved without the support of all staffs, directors, commanders, and top executives in every royal Thai armed forces especially the support from the Minister of Defence in defining the royal Thai armed force self-reliance policy, the push for amending the relevant legislation and the pursuit of cooperation from friendly countries for supporting the country's ability to equalize with friendly countries in the region.

Accomplishments
in 2016

Achievements
in 2016

In fiscal year 2016, Defence Technology Institute (Public Organization) or DTI conducted research and development on various projects according to 2016 master plan with eight significant technologies approved by the National Security Council, focusing on the four strategies as follows :

1st Strategy	Research and Development on Defence Technology
2nd Strategy	Knowledge and Innovation Development to the Public
3rd Strategy	Developing the Networks of Cooperation
4th Strategy	Developing DTI on Self-Reliance

And in 2016, DTI had completed 21 projects according to the four strategies as follows :

Strategy 1 Research and Development on Defence Technology includes :

1. The master plan of rocket systems for national security consists of four projects as follows :

1.1 DTI-1 Multiple Launch Rocket System Research and Development Project

DTI-1 multiple launch rocket system research and development project was conducted according to the government policy that approved DTI in receiving partial technology transfer for the project. The prototype of this system had been delivered to the Royal Thai Army for trial and testing in 2011 at the Artillery Center, Lopburi with the Minister of Defence presiding over the ceremony. DTI then applied the body of knowledge received from an allied country to design and develop a workshop plant 1 for R&D, installed special tools and machinery supporting research and development of rocket propellant grain typed composite in different sizes, assembly line and testing of rocket and guided weapons at Military Explosive Factory, Defence Industry, and Energy Center in Nakhonsawan. The workshop plant 2 was developed by seeking an approval to use the area and the armored vehicle factory, which are the property of the Army Weapons Production Center in Lopburi in order to install special tools and machinery supporting research and development of rocket parts and non-explosive military equipment.

Moreover, DTI utilized the technology transfer for knowledge extension by cooperating with the local defence industry to implement reverse engineering in another system of rocket launcher vehicle and rocket transport truck (Ground Systems) successfully by using local input logistics and passed the flight test simulation from professionals who expertise in rocket design from foreign countries and executed firing test of a rocket launcher vehicle prototype. As for the development of DTI-1 rockets, DTI had assembled semi-knockdown rockets at the R&D workshop plant 1 to be comply with manufacturing standard of the current manufacturing country. The next operational process is an improvement of a rocket launcher vehicle prototype, concerning the launching safety system which has been developed domestically to serve a firing test and facilitate the standard of military weapon and equipment in 2017.

Achievements in 2016

DTI worked with a consultant company in verifying the quality and safety aspect of DTI-1 rocket launcher vehicle and rocket transport truck which DTI conducted research and development domestic by testing with the flight test simulation from professionals whose expertise in rocket design and implemented the prototype with safety prior to domestic firing test to facilitate the standards of military weapons and equipment in 2017 for delivery to Royal Thai Army for trial and test in accordance with the Memorandum of Cooperation to develop the multi rocket launcher system between DTI and the Royal Thai Army.

1.2 DTI-1G Multiple Launch Rocket System Research and Development Project

Started from the delivery of DTI-1G guided multiple launch rocket system prototype to Royal Thai Army in 2011, DTI worked cooperatively with the Royal Thai Army to evaluate the specification and efficiency of the prototype and compared to the present and future threat and assigned DTI to build onto the launch rocket system to be a guided system. Consequently, another guided multiple launch rocket system research and development project was established in 2012 aiming to receive guided system technology transfer from an allied country to extend the existing body of knowledge in conducting a research and development of 302 mm multiple launch rocket system to become the DTI-1G guided multiple launch rocket system by dividing the operation process into 2 phases as follows :

1.2.1 DTI-1G Multiple Launch Rocket System Research and Development Project, Phase I

DTI received significant technology transfer of a guided rocket system from an allied country to meet with the requirement of the armed forces. As for other required technologies,

DTI utilized prior knowledge and technology from the DTI-1 project and brought in the capability of defence industry to support the operation process in order to minimize the budget in receiving the technology transfer. The cabinet approved a long-term budget for the fiscal year for the DTI-1G research and development project, resulted 3 years in total from 2012 to 2015 for the amount of 1,500 million baht. DTI signed the contract to receive technology transfer from an allied country on September 17, 2012 and assigned DTI's researchers to participate in major training courses to design and produce the guidance system, including a field trip to visit a factory manufacturing warheads, rocket propellant grain, cartridges, fin unit, control unit and guidance system, rocket launcher vehicle, and rocket transport truck for the DTI-1G. Furthermore, DTI executed negotiation with the party in delivering design information that was not in the scope of the contract without charge which are design values of thrust profile at normal, high and low temperature, aerodynamic and stability coefficients, including mass properties and six degree of freedom trajectory simulation model (mathematic model).

Later in 2015, DTI and the Royal Thai Army delegates participated in a firing test of the DTI-1G multiple launch rocket system with a firing range of 150 kilometers as stated in the contract of technology transfer at the weapon testing range 501 in Alashan, Inner Mongolia, China. The result of the firing test was a success as all 5 shots of the launched rockets landed away from the target flags with only a 2.3 meter circular error probability (the range used for verification of the rocket firing is 4 in 5 shots landed away 92 meters from the target flag) and was delivered to Thailand on September 16, 2015.

Achievements in 2016

DTI delivered the DTI-1G multiple launch rocket system prototype, Phase I to the Royal Thai Army. The delivery ceremony was given an honor by General Udomdej Sitabutr, Deputy Minister of Defence, being the president of the ceremony, along with General Pisit Sittisan, the Army Chief of Staff, who was present at the ceremony as the delegate. The prototype received will be put in active service at the Artillery Division in Lopburi on February 12, 2017.

1.2.2 DTI-1G Multiple Launch Rocket System Research and Development Project, Phase II.

This project is the implementation of reverse engineering technology by utilizing the prototype that was based on transferred technology to further study and develop for a more effective result. During the past year, DTI utilized the knowledge of the DTI-1 multiple launch rocket system and guided system to develop and enhance the capability of workshop plants (assembly plant) in assembling rocket components of DTI-1G, research and development of DTI-1G rocket launcher vehicle prototype, including DTI-1G rocket transport truck in the country, development

of Command & Control tank to be used together in a battle. The copies of the handbook were submitted to the armed forces while the design development and a warehouse construction for rocket launcher storage and a garage model for storing all prototypes for the Royal Thai Army would be delivered from DTI in order to be in service.

Achievements in 2016

DTI worked collaboratively with the local network of alliances in producing a prototype of 2 DTI-1G rocket transport armored trucks. For the prototype of DTI-1G rocket launcher vehicle, the review of the design and the installation points of subsystem are in the process of seeking an approval for producing a prototype with a fire control system installation in 2017, accordingly.

1.3 The DTI-2 High Performance Multiple Launch Rocket System Research and Development Project

DTI-2 is the multiple launch rocket system research and development project designed and developed by DTI from the prior body of knowledge of the DTI-1 project. By the time that project was implemented during 2010-2014, DTI explored and analyzed research and knowledge development to design a multiple rocket launcher system "DTI-2," which is a 122 mm multiple ground rocket launcher with a 10 km firing range, and also developed tracked type launch platforms and a mockup of the rocket tube to serve a statistic and dynamic test.

DTI then proposed for approval a principle of cooperation for research and development of multiple launch rocket system to support and enhance combat readiness of the Royal Thai Army. The Prime Minister General Prayuth Chan-ocha (holding Commander in Chief, Royal Thai Army at that time) agreed and approved the principle of cooperation dialogue for the research and development of multiple launch rocket system (MLRS) and assigned DTI to develop the system to be in comply with the existing 122 mm multiple ground rocket launcher of Royal Thai Army. Therefore, the co-research and development of the 122 mm multiple launch rocket system was originated between the Royal Thai Army and DTI. The Memorandum of Cooperation signing ceremony for the research development on the 122 mm multiple launch rocket system between the Royal Thai Army and DTI took place on December 8, 2014 with the 3-year operational timeframe from 2015 to 2017.

In 2016, DTI has been continuously conducting research and development on the DTI-2 of the 122 mm rocket with different firing ranges for statistic and dynamic tests, carried out detail design and blueprint drawing of the firing system with the provision of tools and equipment to

accommodate the prototype of the 122 mm rocket with a 10 km firing range. DTI also developed the firing system and the inner tubes as stated in the Memorandum of Understanding (MoU) between Royal Thai Army and DTI at Kao Pu-Loan Artillery Center in Lopburi. The operation and the firing test were conducted in accordance with the master plan.

Achievements in 2016

DTI conducted research and development to develop a prototype of the 122 mm rocket with a 10 km firing range in order to test and measure the thrust profile, pressure profile, and rocket tube strength produced by flow forming method, as well as the rocket with a 40 km firing range to implement statistic test and measure thrust profile of a propulsion system. The test is also to measure the thrust profile and pressure profile and test physical performance of the rocket as well as to test the dynamic firing of the 122 mm rocket with 10 km, 30 km, and 40 km. firing range to test empennage. Moreover, the Air and Coastal Defend Command made a discussion about the requirement and feasibility of the rocket utilization to serve the missions of the authority. Royal Thai Navy Research and Development Office were in touch in making consideration about co-research and development a guided multiple launch rocket system capable of target tracking to serve the mission of the Air and Coastal Defend Command. Finally, DTI received the approval to research and develop a project on the guided multiple launch rocket system between the Royal Thai Navy and DTI.

1.4 Development of weapon testing range project

The process of research and development to produce a multiple launch rocket system and long-range weapons of DTI is required to develop the test and verification system as a tool to verify and test a prototype to meet with the required specifications. Therefore, DTI carried out a project of weapon testing range in order to enhance the capability in the following aspects: (1) Test and Evaluation Personnel Development, (2) Test and Evaluation Equipment Development, (3) Test Site and Facility Development, and (4) Test and Evaluation Manuals.

With regards to site and facility development for weapon testing, the Royal Thai Navy supported this aspect by granting a permission to utilize Phang-nga naval base to be a marine weapon testing range. The Memorandum of Cooperation on development of the weapon testing field between the Royal Thai Navy and DTI was signed on July 29, 2014 and DTI established a plan to develop the evaluation system, which includes standard manual for weapon testing planning, renovation of the site, improvement building construction area and facilities in Phang-nga

navy base and the area around considered to be a firing place to be ready to facilitate the military weapon and equipment of the armed forces and the prototype delivered by DTI. Test and Evaluate Personnel includes various major courses such as the course of Instrumentation Test & Evaluation, Risk Management for Weapon Testing, the training of Telemetry System, the training of Weapon Education and Application of DTI-rocket for the personnel officers of the armed forces. Furthermore, DTI co-trained with Anti Aircraft Artillery Division and Third Naval Area Command to evaluate the readiness of military weapons and equipment transportation as well as the weapon testing field at Phang-Nga naval base 3. The results achieved the following goals; (1) the personnel staff gained knowledge, understanding and experience to support the test; and, (2) DTI accomplished the task that rocket transport trucks and rocket launcher vehicles could be carried in captain's gigs of the Royal Thai Navy.

Test and Evaluation Equipment Development was full of provision and development of tools and various evaluation systems such as 5 Hi-Speed Cameras, Off-shore Targeting system (acoustic), Optical Scoring System (imaging) and Eletro-Optical Tracking System, development and provision of situation illustration system, marine security for a testing director to have the overall situation illustration to support the consideration, including command and test system like Geographic Information System (GIS), Vessel Tracking Management System, and Mobile Command and Communication to control the commands of supporting and test units, etc.

DTI started to implement the first firing test of the122 mm rocket with a 10 km firing range at the marine weapon testing range in Phang-Nga Naval Base on September 2, 2015.

Achievements in 2016

DTI supplied and developed tools and vital evaluation systems to facilitate weapon testing of the armed forces and DTI in the fiscal year 2016 according to the development plan, which consists of Flight Terminal System (FTS), Electro Optical Tracking System (EOTS), Sound Scoring System and TEMA Motion Software.

The capability enhancement of officers and researchers in telemetry onboard is important to advanced electronic circuit making and coding circuit for rocket tracking system and flying destruction, which led DTI to apply the mentioned knowledge to further develop and adopt to utilize with research and development on different types of DTI's rocket project, for instance : DTI-1G rocket with 80 km firing range, weather modification rocket or other projects requiring information transmission between ground station and communication system in a rocket like a sounding rocket.

The major cooperation task with the armed forces such as a conducting a seminar of the supportive plan for the 302 mm rocket firing test with the Royal Thai Navy is held under the

supervision of a delegate from Anti Aircraft Artillery Division, Artillery Center and Policy and Planning Office, Ministry of Defence.

The policy level task according to the Memorandum of Understanding (MoU) on the requirement about cooperation with other government authorities outside the Ministry of Defence is to enable a firing test of a long-range rocket; a meeting for seeking a guidance in utilizing of the marine weapon testing field with internal authorities of the Ministry of Defence (Royal Thai Army, Royal Thai Navy, Royal Thai Airforce, Policy and Planning Office, Royal Thai Armed Forces and Office of the Staff Judge Advocate) and external authorities of Ministry of Defence (Aeronautical Radio of Thailand), Department of Airports, Marine Department, Department of Fisheries and Department of Marine and Coastal Resources.

The development on construction and design and facilities of the weapon testing range such as the construction of rocket storage and the site for explosion objects destruction are held jointly with the Royal Thai Navy implementing the design and approving the construction plan, so that the guided weapon of the Royal Thai Navy can be stored in the assigned place. This investment by DTI is beneficial for the Royal Thai Navy in terms of logistics and weapons and equipment reserves within the area of the Third Naval Area Command of the Andaman coast.

2. The Master Plan for Research and Development on Information Technology and Communication for Defence includes one project, which is:

The Research and Development of Centralized Information Technology and Applied Program

This strategic planning model is aimed to utilize information technology and database connectivity of government authorities for problem solving of the insurgency found in the South of Thailand, which is considered a threat severely resulting in negative effects on the country. DTI has designed and developed the vehicle number plate recognition, vehicle number plate and the suspect data collection system, and vehicle and the suspect warning system, which are to be installed at the Kuan Meed checkpoint and Song Khla task force for trial and testing as well as providing a training of usage and fundamental problem solving of the systems to the Internal Security Operations Command, Region 4, as a user's unit.

Achievements in 2016

DTI signed a Memorandum of Cooperation to research and develop the centralized information technology system and applied program for operational officers responsible for national

security in order to support the problem solving of the political unrest and violence in the three southern provinces of Thailand with the Internal Security Operations Command, Region 4 on and carried out research and development 1 system of control and command prototype and a mobile type of number plate recognition for automobiles and motorcycles system, totally 6 systems (more form the year 2015) to be installed for trial and test in the routes of vulnerable areas.

3. The Master Plan of Simulation and Virtual Reality, which includes one project :

Virtual Reality Simulation Shooting Range Research and Development Project

According to the master plan for research and development on the simulation and virtual reality approved by Council of Defence on February 29, 2012, the basic components of simulation and virtual reality have been started as an initial project to lay the foundation to research and development of an architect scope, standard management, communication management, database management including the management of tools expected to develop the system, applying knowledge and data to conduct a research, and develop an aiding equipment used for demonstration. The total of three sets of the systems were delivered to the Royal Thai Air Force for trial and test on December 11, 2013, to the Royal Thai Army on 13 August 2014, and the last one was installed for demonstration purpose in a research and development of aiding equipment laboratory at DTI. The result from the trial and testing revealed that the prototype could satisfy and respond significantly to the requirements. Consequently, DTI made an extension to research and develop a project of virtual reality simulation shooting range in 2015. DTI conducted a research and developed prototypes of the shooting range system in four units with complete contents and instruction media, including: (1) two units of prototypes for operational level (3 monitors, 12 shooting lanes and 3 units of related system) to be delivered to the Royal Thai Air Force, and (2) two units of mini prototypes for operational level (one monitor, four shooting lanes and one unit of related system) to be delivered to the Royal Thai Army and installed in a laboratory of DTI to be the demonstration and development system unit for the advanced level aiding equipment.

4. The Master Plan of Unmanned Aerial Vehicle (UAV) includes three projects as follows:

4.1 The Fundamental Components of Unmanned Aerial Vehicle Research and Development Project

The master plan was approved by Council of Defence on December 24, 2012 and DTI proceeded with a research and development of unmanned aerial vehicle to deliver to the armed forces for trial and testing. In order to strengthen the continuity of research and development and the actuality of self-reliance, the knowledge about tools and equipment were handled in necessary and appropriate manners for the design, analysis, trial and test of the fundamental components of unmanned aerial vehicle system to lay the foundation to the future action plans and projects of UAV technology.

During the past year, DTI proceeded with a study gathering information about the fundamental components, scope of operational process for the project according to the master plan and frameworks of different standards related to the UAV technology, provision of tools and equipment and programs supporting mechanical engineering for design and analysis of the UAV structure, develop a radio controlled training aircraft and simulator expected to train external pilots, design and handling a drawing plan of building used for UAV trial and test (a blueprint of building renovation for UAV storage station and testing at Wing Division 206, Wattana Nakhon District). Moreover, DTI delivered a prototype of the UAV intermediate tactic rehabilitation training or Tiger Shark III to the Royal Thai Air Force with Air Chief Marshal Tritos Sonchaeng, the Commander-in-Chief of the Royal Thai Air Force, receiving the prototype on September 30, 2015 according to the Memorandum of Cooperation between the Royal Thai Air Force and DTI.

Achievements in 2016

DTI conducted a training course of Internal Pilot for the first time in 2016 to facilitate officers from both internal and external authorities of the Ministry of Defence. The UAV prototypes have been prepared to extend to production lines to serve an actual operation by testing a multi rotor and handling a standard and implementing a test for mini UAV for evaluation from the Royal Thai Army's committee. The Tiger Shark Type III UAV was delivered to Air Chief Marshal Johm Rungswang, the Commander-in- Chief of the Air Force on September 27, 2016. DTI also proceeded with an extended integration project of unmanned aerial vehicles (UAV) to facilitate the standardization and increase its working capacity to meet with the missions in the future.

4.2 The "Siam UAV" Mini VTOL Unmanned Aerial Vehicle with Multi Rotors Research and Development Project

The "Siam UAV" "mini unmanned aerial vehicle with vertical take-off and landing (VTOL) with multi rotors was introduced to be used in short-range reconnaissance, snooping, verification and target pointing with the purpose of reinforcing a problem solving in the national security agencies at a tactical level for the three southern provinces in the South of Thailand. In 2013, the multi rotor was in active service in a government agency, drawing attention from other government agencies such as Ministry of Science and Environment, Ministry of Information and Communication Technology, Communication Technology Division and Royal Thai Army.

As a result, this project was initiated in 2015 with DTI jointly working with the private sector to conduct research and development on vertical take-off and landing unmanned aerial vehicles with multi rotors. DTI extended the existing knowledge for production by increasing the efficiency of the flying operation hours to 45-60 minutes for the vertical take-off and landing capability and flying to determined routes automatically with Return To Home technology. The prototype of this research has led to the production while the test and demonstration were introduced to different authorities such as Development Region office 4, Armed Forces Development Command, Phatthalung province, Anti-drug Pa Muang Task Force, Chiang Mai province. DTI also participated in reinforcing the DTI-2 multiple launch rocket system firing test, exhibiting and demonstration in the Thailand Innovation and Technology for SMEs Exhibition (Mobile cabinet meeting).

Achievements in 2016

DTI delivered the mini VTOL unmanned aerial vehicle with multi rotor to the user units such as Royal Thai Armed Forces Headquarters, Royal Thai Army, Provincial Police Region 6 Station, Provincial Police Training Center Region 1-Saraburi, Department of Special Investigation, and Department of Corrections. General Prawit Wongsuwan, Deputy Prime Minister and Minister of Defence as a delegate of DTI was present in the delivery ceremony, which was also joined by General Udomdej Sitabutr, Deputy Minister of Defence on September 23, 2016.

4.3 The "FUVEC" Fixed Wing VTOL UAV Collaboration Research and Development Project between DTI and Royal Thai Navy Research & Development Office

In Thailand, UAVs are utilized by the armed forces for national security purposes in which research and development have been conducted continuously until today. The Royal Thai Navy by

Royal Thai Navy Research & Development Office were seeking for collaborative research networks according to a policy stated by Commander-in-Chief of the Royal Thai Navy in conducting a research and development of the FUVEC for related units such as NavalAdministration & Operations Department (NOD), users units of Royal Thai Fleet, Royal Thai Marine Corps (RTMC), First Naval Area Command (1ST NAC), Second Naval Area Command (2ND NAC), Third Naval Area Command (3RD NAC), Naval Air Division, Royal Thai Fleet and Air and Coastal Defend Command(ADC), related technique division: (Naval Dockyard Department(ND), Naval Ordnance Department, and Electronic Workshop Division. This project aimed to serve the mission of Royal Thai Navy in different aspects of both strategic and tactical practices. In the meantime, DTI was assigned by National Council of Innovation to be an organization responsible for UAVs so as to entitle them on the innovation list while the private sectors with high production capability of manufacturing a fixed wing UAVs initiated the co-research project with 3 parties seeking for an approval from the DTI committee to proceed with this project in an effort to enhance the ability of reconnaissance, snooping and target pointing of the navy forces and services over the horizontal targeting and increase the participation of the national defence industry sector.

Achievements in 2016

According to the committee of Defence Technology Institute came to conclusion to conduct the research and development on the "FUVEC" fixed wing VTOL UAV with the Royal Thai Navy Research and Development Office and the private sector on February 23, 2016. The Memorandum of Understanding (MoU) on the cooperation of the 3 parties, namely, Royal Thai Navy, DTI and the private sector was signed on May 17, 2016 and the research and development on a FUVEC prototype has been in-between stage with the aim of the assembly, trial and test in 2017, accordingly.

5. The Combat Vehicle and Weapon System Technology Research and Development Project includes the four projects as follows :

5.1 The Wheeled Armored Vehicle Research and Development Project

The wheeled armored vehicles serve the armed forces according to the provision of military weapons and equipment most likely to be used in the Royal Thai Army, especially by the Infantry Regiment Armored Division. At present, wheeled armored vehicles are imported from abroad and one of the models is the 8x8 wheeled armored vehicle. DTI analyzed its mission and found that

research and development on this type of armored vehicle needed to be further developed so as to have a guidance of correction and improvement and support with self-reliance in a sustainable manner. Therefore, this project was proposed to the committee to the DTI committee to approve and put this project in the 2013 action plan on April 30, 2013.

During the past year, DTI proceeded with a preliminary design in order to make a mockup of the 8x8 wheeled armored vehicle equivalent to the actual one for a user to make consideration and propose a requirement for further corrections and improvement to a complete stage. The Memorandum of Cooperation to research and develop a prototype of the 8x8 armored vehicle between the Royal Thai Army and DTI was signed on November 24, 2015. The ceremony was joined by the Commander-in-Chief, Major General Adisorn Korop, Director-General of Royal Thai Army and Major General Danai Krittamethavee, Commander-in-Chief of Infantry Center, Chairman of the working group of co-research and development of the wheeled armored vehicle. DTI conducted the research and development on one 8x8 wheeled armored vehicle prototype for delivery and another 8x8 vehicle for testing the protection level of explosion according to STANAG 4569 Level 2a standard by aiming to deliver the prototype to the user units of the Royal Thai Army for trial and test, as stated in the Memorandum correspondingly.

Achievements in 2016

DTI proceeded with the test, functional competency and standard performance assessment of the 8x8 wheeled armored vehicle prototype. DTI also improved and repaired the prototype to restore its condition and verify the readiness of its system and condition to facilitate the Royal Thai Army weapons and equipment standard test.

5.2 The Wheeled Armored Vehicle Research and Development Project to Support the Mission of the Royal Thai Marine Corps, Royal Thai Navy

This research and development project was an application and extension of related knowledge and technology of the 8x8 wheeled armored vehicle proposed to the Royal Thai Navy through the Royal Thai Naval Research and Development Office with the Royal Thai Marine Corps being the major user in response to the 2nd edition of the battle doctrine included the 8x8 wheeled armored vehicle developed by DTI. During the past year, DTI assisted in application and extension of existing knowledge and related technology to develop the 8x8 wheeled armored vehicle while discussed with the user units to summarize a conceptual design, and analyze its specification draft design to make a mockup of the vehicle to be in comply with the mission

of the Royal Thai Navy and proposed to the user units for acknowledgement before making a prototype to meet with a capacity utilization.

Achievements in 2016

DTI held a signing ceremony of Memorandum of Understanding (MoU) on the of research and development cooperation on the wheeled armored vehicle to serve the mission of Royal Thai Marine Corps, Royal Thai Navy on May 17, 2016. DTI also joined the other user units in producing a project plan and considering the specification of a wheeled armored vehicle that would be applied for a development of the assembly parts. The prototype was expected to be completed in 2017 for trial and testing.

5.3 The Remote Control Weapon Systems (RCWS) Research and Development Project

DTI has been conducting research and development in response to the requirements in the operational process of different combat vehicles by designing a system that can facilitate diverse weapons depending on the mission of each unit such as a 7.62 mm machine gun, 12.7 mm submachine gun, 20 mm machine gun and a machine gun with multiple grenade launcher, including automatic bombing machine, and anti-tank guided missile launcher. Moreover, there was an installation of observation system for combat vehicle commander, target searching system, target pointing for day and night, thermal image and stabilization system to help enhance the efficiency of Royal Thai Armed Forces in order to battle and attack threats or violence faster, more precisely as well as to minimize the dependency on foreign technologies and importation.

Achievements in 2016

DTI studied and designed an analysis of subsystem as well as research and development to make a prototype of a remote control weapon system in cooperation with Kasetsart University and the private sector to carry out a fire control system program development in the following stages: Phase 1 (the study of both domestic and foreign remote control weapon systems, design, and testing concept to make a prototype of fire control system, target searching system, weapons-movement-targets system, target tracking system, ammunition firing calculation, lead angle calculation, mechanism of the recoil of a gun, trigger pulling and mechanism of a machine gun in general) with the purpose of having a prototype of the remote control weapon system enabling to control a movement of platform (to be continued in 2017).

5.4 The 30 mm Ammunition and Primer to Production Line Research and Development Project

According to the urgent policy issued by the Commanders-in-Chief of the Armed Forces, expecting an application and extension of the existing 30 mm ammunition and primer to a standard production line since that the Armed Forces require the ammunition of the 30 mm automatic cannon for both tactical and training practices to serve the benefits of weapon familiarity as well as to prepare combat readiness as stated in the military doctrine. DTI has initiated research and development on the 30 mm ammunition by joining with the domestic private sector whose high capability and capacity is in producing ammunition to making a prototype of the ammunition in the size 30x165 mm and 30x173 mm to be ready for production line. The aim of the project is to encourage the cooperation between the government and the private sector to reinforce defence technology industry in producing military weapons and equipment within the country in a sustainable manner.

Achievements in 2016

DTI studied and determined a guide and application of a program called Product Lifecycl Management to make a prototype of the 30 mm ammunition, improved and developed design process and illustration supporting the development of tools and equipment used for a standardized test and making the prototype of the 30 mm ammunition for 1,000 shots for testing and evaluation by the user units.

Strategy 2 The Development of Knowledge and Innovation for the Public

This project is aimed to collect the informative data and analyze defence technology data in Thailand and foreign countries including the following: the direction and tendency under the progress and development on defence technology, research and development on battle force capability policies, military weapon and equipment procurement, development and improvement plan for strengthening the capability of the armed forces, defence technology industry, and the capability of authorities. The data collected are used to determine the direction of DTI's research and development to match with the changing environment and in accordance with the users' requirements or stakeholders for the benefits of defence technology knowledge and data center and the academic service distribution system for both internal and external authorities of DTI.

Achievements in 2016

DTI organized a report of the data collected from domestic and abroad to create the quarterly defence technology analysis report, two handbooks to distribute defence technology data in the topics of maritime fighting platforms, rockets and missiles, reviews and articles about defence technology, defence technology industry, news about national security publicized via the DTI website (www.dti.or.th), the feasibility studies of research, and development of 2.75 inch rocket. DTI also held a seminar on defence technology under the topic of submarine technology for national security on April 5, 2016.

2. Academic Publications Project

DTI has been offering several academic publications and articles from the research conducted to be published at both national and international levels so as to establish the prestigious reputation and recognition in the academia as well as to develop our researchers to have the expertise knowledge and competency. DTI also created research cooperation networks and gathered all the body of knowledge and outputs acquired from research and development in the form of documents to enabling them to be published to provide access for the general public.

Achievements in 2016

DTI published academic articles in academic conferences and publications at both in national and international levels in total of 83 topics as follows:

- Articles publicized in 3 issues of international journals:

(1) Extension of Visualization of Spatial Distribution of Random Waypoint Mobility Models by Jiradett, published in Journal of Computers

(2) The Application of VoIP Technology on Ship's Interior Communication System, by Tawiwat Veeraklaew, Jiradett Kerdsir, Settapong Malisuwan, Jitti Sampattakul, published in INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH & DEVELOPMENT www.ijird.com

(3) HIGH TEMPERATURE CORROSIONO F 310S AUSTENITIC STAINLESS STEEL IN CO2/HCL ENVIRONMENT by Tosapolporn, published in International Journal of Mechanical And Production Engineering

- For articles published in academic conferences, international level published in full paper including articles published in national academic conferences and in other forms of publications are in total 80 issues (accessible via http://publication.dit.or.th).

3. Developing Personnel in Academia, Industry and Private Sector Project

The project has been conducted in accordance with the science and defence technology curriculum for graduate courses so as to develop and produce personnel in defence technology field in response to the requirement of the government authorities, the private sector, and the defence industry sector to provide academic activities as well as to offer research grants, and cooperation from academic institutions at both national and international levels to support DTI research implementation. In addition, DTI joined academic lectures and seminar with the armed forces institutes and alliance academic institutes to be ready for competitiveness of defence technology industry at an international level.

Achievements in 2016

DTI implemented a support to develop and produce personnel in defence technology by joining King Mongkut's Institute of Technology Ladkrabang in providing a course on defence engineering and providing 4 scholarships to the military officers to pursue further study in defence engineering, including research grants with the intention to create knowledge application and extension in research and development. The total six projects which details are as follows:

(1) Development of Rectenna system for military energy tasks by Associate Professor Dr. Chuwong Pongcharoenpanich, Faculty of Engineering, King Mongkut's Institute of Technology Ladkrabang

(2) Conductivity of Electrolyte Ionic, molten sodium chloride at high temperature by Dr. Supatcharee Roddaecha, Faculty of Engineering, Kasetsart University

(3) Development of a prototype of multi-agent system for simulation, stage 2 by Dr. Chattrakul Sombattheera, Faculty of Informatcis, Mahasarkham University

(4) Small composite propellant rocket motor by Major Dr. Chalerksak Dasaard, Chulachomklao Royal Military Academy

(5) Mathermatical Modeling and Simulation of Radar Antenna by Flight Lieutenant Dr. Thiensiri Luangwilai, Navaminda Kasatriyadhiraj Royal Thai Air Force Academy and

(6) Development of Explosives Detection System with Neutron Activation Analysis process (NAA) on unmanned aerial vehicle, phase 1: Development of unmanned aerial vehicle with more than 20 kilograms load capacity by Flight Lieutenant Dr. Parinya Anantachai, Navaminda Kasatriyadhiraj Royal Thai Air Force Academy

DTI also held a lecture on defence technology with the topic of the Research and Development on Tiger Shark with the extension of knowledge for research and development of UAV for related units under the supervision of Ministry of Defence and academic institutions on March 3, 2016.

With regards to cooperation with the domestic academic institutions, DTI has signed Memorandums of Understanding (MOUs) on academic research with Chiang Mai university and Mahasarakham University (for the second time), King Mongkut's University of Technology North Bangkok, King Mongkut's University of Technology Thonburi, Thailand Institute of Nuclear Technology (Public Organization) including seeking cooperation with Thailand Research Fund (TRF) to support the Royal Golden Jubilee Ph.D. Program.

Strategy 3 Developing the Networks of Cooperation

1. The Cooperation in Research and Development with Various Sectors Project

Implementation of development project of cooperation in research and development under the DTI master plan is essential to operate with the user units to raise awareness, understanding and reliability to accomplish the tasks according to the requirements, policy support in a commander level, responding to the missions of tactical and strategy practices that reinforce the outputs derived from research and development to be in active service for trial and testing in the armed forces. Furthermore, building good understanding and great working relationships with the Royal Thai Navy resulted in reliability and confidence in building DTI's capability and outputs through different activities for in-depth understanding leading to actual cooperation.

Achievements in 2016

DTI developed cooperation on research and development of military equipment and defence technology with the government agencies and the private sector' research units to develop cooperation network for policy support in submitting the outputs or products from research to be in active service and for further trial and testing as follows :

1. Cooperation with internal authorities within Ministry of Defence consists of 4 issues as follows:

(1) Memorandum of Understanding (MoU) on cooperation of research and development on science and defence technology between Ministry of Defence and DTI (building cooperation, encouraging and supporting research and development on science and defence technology leading to defence technology industry) on February 10, 2016

(2) Memorandum of Understanding (MoU) between Royal Thai Navy and DTI on cooperation of co-research and development on the wheeled armored vehicle to serve the mission of Royal Thai Marine Corps on May 17, 2016

(3) Memorandum of Understanding (MoU) on cooperation of research and development of

centralized information and communication technology system and applied program for officers in national security authorities to support a problem solving in the south of Thailand, between Internal Security Operations Command Region 4 and DTI on August 2, 2016

(4) Memorandum of Understanding (MoU) on cooperation of implementation of standard certifying 30x173 mm and 30x165 mm training ammunition between Royal Thai Navy and DTI on July 28, 2016

2. Cooperation with authorities out of Ministry of Defence includes 2 issues as follows:

(1) Memorandum of Understanding (MoU) on cooperation of research and development of weather modification rocket between DTI and Department of Royal Rainmaking and Agricultural Aviation-Ministry of Agriculture and Cooperatives on January 25, 2016

(2) Memorandum of Understanding (MoU) on cooperation of research and development of science and technology between DTI on June 24, 2016

3. Cooperation with academic institutes consists of 4 issues as follows :

(1) Memorandum of Understanding (MoU) on cooperation of academic aspects between Chiang Mai university and DTI (to develop body of knowledge and produce personnel specialize in science and defence technology) on January 21, 2016

(2) Memorandum of Understanding (MoU) on cooperation of academic aspects between Mahasarakham University and DTI (to develop body of knowledge and produce personnel specialize in science and defence technology) on February 10, 2016

(3) Memorandum of Understanding (MoU) on cooperation of academic aspects between King Mongkut's University of Technology North Bangkok and DTI (to coordinate and cooperate in academic aspect and to develop body of knowledge and produce personnel specialize in science and defence technology) on April 7, 2016

(4) Memorandum of Understanding of "Research and Development of Explosive ordnance disposal robot prototype project (EOD Robot)" between DTI and Chiang Mai University on June 10, 2016

4. Cooperation with the private sector consists of 4 issues as follows :

(1) Memorandum of Understanding (MoU) on cooperation of research and development of information and communication technology for sustainable integration between DTI and Intelligent Telecom Solutions Co, Ltd., on July 12, 2016

(2) Memorandum of Understanding (MoU) on cooperation of research and development of science and technology between DTI and HUMAN & SPACE PVT.LTD., on March 29, 2016

(3) Memorandum of Understanding (MoU) on cooperation of science and technology between DTI and Kaiser Communications Co, Ltd., on July 29, 2016

Additionally, DTI provided reinforcing activities to promote in-depth understanding, reliability and confidence in DTI's capability and outputs leading to the development of cooperation through different activities such as participation in the exhibition in Defence & Security 2015, Asia's most

important Tri-service Defence and Internal Security Exhibition where researcher units and leading defence and internal security companies and exhibitors show researches and development of defence technology prototypes from domestic and abroad, holding academic seminars to reinforce capability of DTI's research and development of unmanned aerial vehicle, organizing Road Show to present outputs from DTI's researches to related authorities for acknowledgement and recognition about the mission and capability of DTI, building relationships with the armed forces and user units through various kinds of activity.

2. Public Relations Project

The implementation of research and development on DTI has been based on cooperation with the external authorities both from the government and the private sector including the transmission of knowledge and cooperation on DTI's research and development. Therefore, it is necessary to build recognition and understanding via mass media, achievements, progress and DTI's activities to help continuously support reliability and good image for being "an organization who plays an important role in promoting the stability of military weapons and equipment for the country with sustainable self-reliance."

Achievements in 2016

DTI implemented public relations to show a concept of major policy, vision leading the organization to fulfill the mission and successful outcome in research and development through mass media, publications, radio-television programs, social media and military journals under various topics such as DTI news, which is about DTI's endeavor to conduct research and development military equipment prototype, the delivery of unmanned aerial vehicle to Royal Thai Air Force, the signing ceremony of Memorandum of Understanding (MoU) for cooperation with Department of Royal Rainmaking and Agricultural Aviation, the delivery of DTI-1G multiple launch rocket system prototype to Royal Thai Army for trial and testing, holding operational seminar of the EOD robot, joining with Naval Ordnance Department to carry out firing test for 30 x 173 mm and 30 x 165mm training ammunition, organizing lectures and exhibition to publicize body of knowledge acquired from DTI's research and development in military academic institutes and journal, DTI Yes! for the benefit of public relations and exchange of information within the organization.

3. The Corporate Social Responsibility Project

With the policy concerning corporate social responsibility and community considered and stakeholders of DTI and to create positive attitude and good cooperation as well as good image to the organization, DTI carried out activities for society and community in terms of encouraging quality of life, strengthening and developing science and technology knowledge for youths aspired to be scientists in the future.

Achievements in 2016

DTI developed cooperation networks with neighboring community considered as stakeholders through scholarship presentation ceremony to children of government officials in the authorities under supervision of Ministry of Defence to expand educational opportunity for youths in community, development of youth's skill who are interested in science and technology through the test of demonstrated innovative rocket giving knowledge and encourage the youths to design and make a rocket for testing, a kind of technology development that can build onto body of knowledge to produce new generation of researcher and scientists to the society.

Strategy 4 Developing DTI on Self-Reliance includes 3 projects as follows:

1. Organizational Culture

With the policy to promote and elevate the quality of human resouces to lead the organization to an international level through development of culture and value of the organization for a significant recognition, DTI has gathered behavior patterns and existing belief and the new ones aiming to develop to be an organization's culture to drive the organization efficiently and reflect a good image in the public's eyes with continuous implementation.

Achievements in 2016

DTI raised an awareness of organization values and encourage the practices following the values through a tradition that personnel at all levels in the organization can participate in the following activities: organizing a New Year Party, making merit and alms to commemorate on DTI's foundation day, the 7th anniversary, activities during Songkran festival such as a tradition of pouring water on the hands of revered elders and asking for blessing, operational seminar : DTI We Can Do 2016 for developing workshop plant and schools in neighboring communities with

the cooperation of management executives and DTI staff officers, activity for competency test and sports day to encourage management executives and staff officer to see an importance of exercising and playing sports, and retirement ceremony showing gratitude to retired personnel who devoted their capabilities and endeavors throughout the years.

2. Human Resource Development project

Human resource is considered as one of the key success factors to drive an organization to complete its mission according to the expected goals. DTI elaborated Human Resource management by organizing personnel development training aiming significantly to encourage and promote working capability based on quality and quantity. The personnel training and development plan are categorized in 3 levels; Executive level, Functional level, and Individual level based on the necessity according to duties and responsibilities. Specialized training can enhance knowledge and working skill for the maximum efficiency of working.

Achievements in 2016

DTI provided more than 90 training courses to develop working capability and capacity for personnel based on the necessity of the job description for each individual. Those who passing the training will be measured on their key performance satisfaction by a chief/commander about how to apply and develop the knowledge obtained from the training to utilize for mission and transmit the body of knowledge to their colleagues to ensure the efficiency and effectiveness of the organization.

3. Basic research project

DTI has been a major supporting organization in research and development for Ministry of Defence in applied research which requires extension of basic researches by utilizing knowledge in science and technology to produce innovative outputs and products. Therefore, it is necessary to provide basic researches for researchers to reinforce their capabilities in exploring and performing experiments for future study while maximizing the qualities to be equal to those of other research organizations in both national and international levels.

Achievements in 2016

Throughout the year 2016, DTI implemented fundamental research projects supporting the organization's mission to reach their goals successfully in the form of research reports in total of 20 topics as follows :

(1) Research and development of high power explosive (CL-20)

(2) Research skill development of new generation of training devices in accordance with defence technology trend

(3) Research and development of Para rubber for military tasks and activities

(4) Research and development of Self Organization TDL

(5) Development of communication technology and guidance system of highly capable rocket (Design and produce a prototype of movement and direction control with Electro mechanical actuator)

(6) Body of knowledge research for propellant system (development of smokeless propellant, hybrid rocket motor and rocket motor insulation)

(7) Body of knowledge research for aerodynamics

(8) Development of laboratory of military renewable energy for defence

(9) Research of materials used in defence industry (test for evaluation the corrosion rates with immersion test of DTI2 MKII)

(10) The application of Flow Forming technology in producing a prototype of rocket parts

(11) Research and development on a prototype system of Automatic Suspect Vehicle Recognition.

(12) Research on a demonstration system of guided rocket technology

(13) Research on basic mechanical system of primers for launch rocket.

(14) Research and development on underground explosive detector

(15) Research on military radio communication

(16) Research and development on anti-tank rocket

(17) Research and development on scientific experiment rocket (Sounding rocket)

(18) Research and development on weather modification rocket (developed to be a new starting research and development in 2017)

(19) A study of feasibility of installation GPS to Laser Guide Bomb (phase 1)

(20) Research and development of the application of simulation and virtual reality technology (simulation of flooded areas by information acquired from Digital Surface model (Flood Hazard Area Simulation from Digital Surface Model), create virtual world with Unity 3D program by Nakorn Sawan Workshop, design a demonstration system of disaster simulation, analysis of shooting point of an anti-tank rocket training device in a training room)

(21) Research of EOD Robot joining with Air Force Ordnance Department (developed to be a new starting research in 2017)

(22) Cyber Security Research

DTI have applied the knowledge obtained from the mentioned research to support the execution of research and development on military equipment prototypes for the Armed Forces, which is considered a major mission for DTI.

2017 Action Plan

2017 **Action Plan**

The primary mission of Defence Technology Institute (Public Organization) or DTI is to conduct research and development of large-scale military equipment as specified and approved by Defense Council to execute a project and other missions related or continued to existing of defence technology development. Each year DTI enacts an action plan to be a framework for the operational process, putting together Thailand's 20 years Transformation Roadmap (year 2017-2036), the 11th National Economic and Social Development Plan, and the 2017 Budget allocation of Bureau of Budget and Action Plan for the Ministry of Defence, directed by a 15-year-strategic plan (2010-2024) as a framework. In 2013, DTI determined a framework to conduct a research and development under four main strategies, focusing on research and development on defence technology, primary missions to continue ongoing projects and projects supporting urgent policies of government, and projects under the master plans approved by the Defence Council as well as projects following the strategies 2-4, aiming to support projects under the first strategy to reach its achievement. The overall action plan and objectives in the fiscal year 2017 can be summarized below.

Strategy 1 Research and Development on Defence Technology

The vision of Ministry of Defence is to enhance the capabilities to conduct research and development on modern defence technology to create military weapon prototypes that encourage the domestic industry to take part in manufacturing, enabling both national and international strategic environment assessment.

1. The Research and Development on Missile Technology for National Security Master Plan

The scope of this research includes missile technology and guided missiles in different dimensions and strategies, inhibited red fuming nitric acid missile technology, propellant system of ballistic missiles, and control and direct system, providing a weapon testing site and development of a testing target. The plan consists of five projects in detail as follow :

1.1 The "DTI-1G" Guided Multiple Launch Rocket System Research and Development Project

The research and development on the "DTI-1G" guided multiple launch rocket system is a continuous project started from the DTI-1 multiple launch rocket system. DTI integrated the body of knowledge and capacity to construct DTI-1G (Guided) to increase the accuracy of the rockets. The operational process is divided into two phases. The DTI-1G Phase 1 is the partial transfer technology from an allied country with the approved budget for project from 2012-2015 at the amount of 1,500 million baht. DTI signed the contract to receive the technology transfer from an allied country on September 17, 2012. For the DTI-1G Phase 2, it is the process of extracting knowledge or design information to reproduce a prototype based on the DTI-1G multiple launch rocket using reverse engineering to enhance the capability of researchers and assembly plant of DTI in developing a prototype of a launcher vehicle and DTI-1G missiles to be delivered to the Royal Thai Army. The representative of the Royal Thai Army and Chief Executive of DTI signed a Memorandum of Corporation to develop the multi-barrel missile DTI-1G on March 3, 2013.

In 2016, DTI followed the contract of technology transfer by sending researchers and invited the Royal Thai Army representatives to attend a training course about designing and manufacturing the guided version of DTI-1G, including the field trip to study a multi-barrel rocket system assembly plant at an allied country to pass on the body of knowledge to the researchers at DTI. The representatives from the Royal Thai Army joined the firing test at a weapon testing range in People's Republic of China. The result revealed that the prototype had high precision in firing and powerful attack power, the prototype of the multi-barrel rocket DTI-1G system 1 launcher vehicle was delivered (the one with technology transfer program aimed to enhance the defence capacity) as well as a Command & Control tank (the one designed and produced by DTI and delivered to Royal Thai Army for testing on February 12, 2017.

Additionally, DTI also implemented the body of knowledge on the multiple launch rocket system and the technology transfer, to enhance the capability of the assembly plant for parts assembly, including necessary equipment to assemble rocket components of DTI-1G-Semi Knockdown-SKD 5 rocket launcher completely. DTI also put together the technology transfer to conduct reverse engineering by designing and producing a prototype of a rocket launcher and a rocket launcher vehicle for the DTI-1G multi launch rocket expected to be completed in 2017.

Action Plan in 2017

In 2017, DTI developed a prototype of rocket launcher transport truck and the DTI-1G multiple launch rocket system vehicle which is an ongoing project from the previous year to

install the Fire Control System and implement tactical exercise at a weapon testing range before delivering to Royal Thai Army for the standardization of military weapons and equipment for 2018.

1.2 The "DTI-2" Research and Development Project

The DTI-2 project is the research and development on the multiple launch rocket system designed and developed by DTI to build onto a body of knowledge of the existing DTI-1 multiple launch rocket system by receiving the technology transfer from an allied country. During the first period of the DTI-2 project (2010-2014), DTI explored and analyze for research and knowledge development to design a conceptual framework for the DTI-2 multiple launch rocket system, a 122 mm multiple ground rocket launcher installed on a tracked type 85 chassis so as to serve the statistic test and dynamic test.

Later, the Prime Minister General Prayuth Chan-ocha (holding Commander in Chief, Royal Thai Army at that time) agreed and approved the principle of cooperation dialogue for the research and development of multiple launch rocket system (MLR) and assigned DTI to develop the multiple launch rocket system to be in comply with the Royal Thai Army's existing 122 mm multiple ground rocket launcher. Therefore, the co-research and development of the 122 mm multiple launch rocket system was originated. The signing ceremony of a Memorandum of Corporation for development on the 122 mm multiple launch rocket system between Royal Thai Army and DTI took place on December 8, 2014. The operational timeframe between 2015-2017 and the delivery of the prototype are specified as stated on the Memorandum of Cooperation as follows :

1. A prototype of the 122 mm training rocket with a 10 km fire range and the inner tubes assembly for live firing tests with DTI-1 and the fire control program to facilitate the Military Equipment Standard

2. A prototype of 122 mm with 10 km and 40 km firing range for self-propelled rocket launcher to facilitate the Military Equipment Standard

3. A prototype of 122 mm caliber rockets with 10 km, 30 km, and 40 km firing ranges installed on the existing tracked platform of the 130 mm caliber rocket and the development on the fire control program to replace the 130 mm caliber with the 122 mm caliber rocket system on the existing tracked platform as well as a rocket launcher transport vehicle to facilitate the 122 mm caliber rocket system on the existing tracked platform as well as a rocket launcher transport vehicle to facilitate the Military Equipment Standard.

4. Depots for rocket warheads and a warehouse for the storage of the armored vehicles with the 130 mm rocket launcher mounted on top of the hull (MLR 31) installed with the 122 mm

caliber rockets system and a rocket launcher vehicle.

During the past years, DIT conducted a research and development a prototype of the 122 mm caliber rocket with a 10 km firing range for live firing tests and evaluating the utilizing of a prototype technique with the 122 mm caliber rocket and the inner tubes (the no.1 product stated in the Memorandum of Cooperation between the Royal Thai Army and DTI) at Kao Pu-Loan Artillery Center in Lopburi. The operation and firing test was in accordance with the master plan and were in the interim of a research and development a prototype of 122 mm caliber rocket with the 40 km firing range for a self-propelled rocket launcher (SR4), a research and development of an armored vehicle with 130 mm rocket launcher mounted on top of the hull (MLR.31), installing 122 mm multiple launch rocket system with the 122 mm rocket launcher transport truck and rocket launcher, the firing range is 10 km, 30 km, and 40 km. Regarding a rocket launcher vehicle, it is now waiting to be approved of a warehouse construction for the storage of launchers, armored vehicles and rocket launcher transport trucks in 2017.

Action plan in 2017

DTI specified major action plans in research and development on the 122 mm rocket launcher prototype with 10 km and 40 km firing range for a self-propelled rocket launcher (SR4) which is in active service at the Royal Thai Army, a research and development on the 122 mm rocket launcher prototype with firing range at 10 km, 30 km and 40 km for an armored vehicle with a rocket launcher (MLR.31), a research and development on the prototype of an armored vehicle with 122 mm rocket launcher mounted on top of the hull to facilitate the Military Standard, the process of seeking an approval of a warehouse construction for the storage of launchers ,armored vehicles and rocket launcher transport trucks following the required products that will be delivered as stated in the Memorandum of Cooperation between the Royal Thai Army and DTI. Additionally, there will be a discussion with the Royal Thai Armed Forces about research and development on ballistic missiles in the future.

1.3 Weapon Testing Range Development Project

A weapon testing field development project by DTI is established to enhance the capability in the aspects of testing and evaluation of the domestic long range weapon testing range that meets an international standard to support the testing and evaluation of the DTI-1 rocket system, which will be delivered to the Royal Thai Army. Moreover, it can be used as a weapon testing range that the Royal Thai Army and the other armed forces can utilize for live firing test of long range weapons. It can also be used as a testing field for a prototype of military weapons and

equipment that will be conducted a research following 15-year-master plan of DTI. During the past years, DTI implemented equipment searching and evaluation system providing for weapon testing and personnel training in a necessary course so as to strengthen the skills and competency in being an expert in the evaluation of the weapon systems, including cooperation with specialists in foreign countries, safety and security of weapon testing field and a guideline to develop a long range examination system, coordinating with Royal Thai Navy Third Fleet for corporation in seeking an approval for using an area in the Phang-nga Naval Base to be a testing field for long range weapons, and renovating building construction areas and accommodating the basic facility. There was a co-training to evaluate the readiness of military equipment transport system and the weapon testing field at Phang-nga naval base, Royal Thai Navy, Third Fleet for the first time in September 2014 and DTI implemented firing test of the 122 mm rocket (Dynamic test) at 20 km firing range and 40 km firing range at the marine testing range on September 2, 2015 and the second time on June 29, 2016 and the test results was in accordance with the expected plan.

Action Plan 2017

DTI establishes a major plan to develop the equipment, testing and evaluation system to facilitate a test certify a standard relevant to the standard of international weapon testing field by providing Range Instrumentation Radar plan with directional range at 100 km, cooperation plan with Thai Armed Forces and experts from foreign countries, project monitoring plan for construction and facilities development provided in a weapon testing field joining with the Royal Thai Navy, Vessel Traffic Monitoring System (VTMS) to prepare readiness, and accommodate announcement planning of marine weapon testing and improvement of trucks and cargo rocket with unmanned rocket vehicle launch pad for the 303 mm diameter rocket of DTI-1 and DTI-1G in 2017.

1.4 The Multiple Rocket Launcher with 80 km Firing Range Research and Development Project

As a result of receiving the technology transfer from an allied country about the DTI-1 multi-barrel rocket system which can conduct reverse engineering to further develop different types of rocket, DTI also conducted research and development on the multi rocket launcher with different firing ranges such as 122 mm multiple rocket launcher with firing range at 40 km and 302 mm mutiple rocket launcher (DTI-1 and ATI-1G) with firing range at 60 km. However, the firing range at 40-60 km lacks of weapons to support. DTI then implemented research and development on a multi rocket launcher for both guided and unguided systems to increase the accuracy of the rockets that DIT has developed at every firing range. In 2016, DIT designed and developed

a weather modification rocket to implement a testing and confirmation of a design result before enacting the qualification test in 2017.

Action Plan in 2017

DTI schedules a major plan to implement analysis and preliminary design to produce rocket warheads with multi rocket launcher type DTI-11A for testing the concepts of components and subsystem for a consideration of utilization by testing with a preflight checklist with a rocket launcher vehicle DTI-1 so as to take the test results for improvement and benefits of detail design. DTI has also developed components and subsystem of the multiple rocket launcher with rocket launch controller and launch pad for 2018.

1.5 The Weather Modification Rocket Research and Development Project

His Majesty the late King Rama IX had initiated a research and development of a rocket containing rain-making chemicals be fired into the clouds either from the ground or from an aircraft. He recognized that an artificial rain rocket could replace the use of aircraft to spread rain-making chemicals when a tactical practice was limited (Department of Royal Rainmaking and Agricultural Aviation, 1970). Later, in 1981-1987, the National Research Council of Thailand conducted a research jointly by the Royal Thai Armed Forces and Department of Royal Rainmaking and Agricultural Aviation about artificial rain-making rocket by applying a rocket engine of a 2.75 inch folding-fin ground attack rocket, double-base propellants to make artificial rain. The successful results were achieved as the rocket could contain chemicals and spread them out at a specified level. However, since the rocket had limited capacity in carrying a small amount of chemicals, it could not be used in the actual rain-making operation. At present, an amount of rain-making chemicals can be minimized and can be contained in a head of rocket. It has been also found that a utilization of rocket and anti-aircraft cannon ammunition containing silver iodide fired into the clouds from the ground to restrain the occurrence of hailstorm has been widely used in People's Republic of China. The Department of Rainmaking and Agricultural Aviation recognized that DTI is capable of the technical expertise and resources able to support a research and development of a rain-making rocket. Therefore, the cooperation in research and development of weather modification rocket is originated to enhance the operation process in restraining a hailstorm more efficiently and be a guideline applying to different patterns of artificial rainmaking accordingly.

Action Plan in 2017

DTI schedules a major plan to conduct research and development on a prototype of a weather modification rocket with 120 shots with a rocket launch pad and a high speed rocket mounted on a small truck to implement a qualification test to meet the Military Specification as designed in 2016. It is also to take the test results for improvement of a prototype of a weather modification rocket and to be able to deliver to Department of Rainmaking and Agricultural Aviation for trial and testing in 2018, accordingly.

2. The Master Plan on Information Technology and Communication for National Security Consisting of One Project

The scope of this technology consists of the control and command system, combat management system, integrated military communication, tools and equipment in the communication networks, tactical data analysis and connectivity system, and military data encoding technique with one project as a result.

2.1 The Centralized Information technology System and Applied Technology Program Research and Development Project

The unrest situation and insurgency in Thailand's three southern provinces is a major problem requiring all sectors to collaborate and solve the problem as soon as possible because it is a frightening threat causing negative effects on national security immensely. Therefore, in order to increase and support the higher effectiveness of operation process of operational officers in the area, DTI has proceeded with a research and development in combining information technology and connectivity of data base system for operators to be able to monitor and control various warnings through efficient information technology equipments. During the past years, DIT signed a Memorandum of Cooperation with Internal Security Operations Command, Region 4 on August 2, 2016 to implement research and development on the centralized information technology system, and applied technology program for operational officers responsible for national security and to support the problem solving of non-peacefulness and violence in the 3 provinces of the southern of Thailand. DTI has designed research and development on the Command & Control system-C2, enacted vehicle number plate recognition technology for both permanent and mobile checkpoints, and gathered the vehicle number plate data and the suspects together with warning system to alert the operational officers as soon as the vehicle or the suspect are found. These systems have been installed at Kuan Meed checkpoint and at Songkla task force for trial and testing.

DTI has determined a plan to develop a prototype of Command & Control-C2 system, and improved the vehicle number plate recognition technology for Kuan Meed permanent checkpoint for higher efficiency under the cooperation with other authorities in order to connect the database sharing the benefits as well as to study the data analysis system to have higher efficiency of the pattern recognition. Moreover, DTI has also scheduled an extra plan to develop on the communication aspects of the vehicle number plate recognition of mobile checkpoints in the areas with poor signals, enhancing the efficiency of data analysis from pattern recognition to routing, models and vehicle brands.

3. The Simulation and Virtual Reality Research and Development Project

The scope of technology consists of the simulation and virtual reality and battle simulator for the Royal Thai Army, Royal Thai Navy and Royal Thai Air Force. The details of the operational plan and budget for the fiscal year 2017 are as follows :

3.1 The Shooting Range System Research and Development Project

Regarding the master plan on the virtual reality simulation technology research and development, the virtual reality simulation shooting range system has been developed in response to the need of high technology simulation and training equipment of military staff to provide knowledge and expertise to the officers utilizing the weapon system and tactical exercise in the infantry platoon and squad level. In 2014, DTI conducted a research and development on a prototype of virtual reality simulation shooting range system, which was delivered to the Infantry Center, Royal Thai Army and Security Force Regiment, Royal Thai Air Force for trial and testing. The Royal Thai Army has a policy to urge officers at battalion level division to invent and make a simulation and training equipment for the division to attain the most efficient operational capabilities. Therefore, DTI proposed the virtual reality simulation shooting range system to the Royal Thai Army to consider a direction and potential in conducting a research and development of economical shooting range system for the staff at battalion level to train for expertise in using their weapons by seeking domestic hardware with the same standard quality at a reasonable price. The project also includes research and development on a software system, which is considered to be an intellectual property of DTI regardless of licensed software installation which would cause a burden to the users. Moreover, this software system can be defined a requirement that can fit into a training.

DTI was granted a fund from National Research Council of Thailand (NRCT) to promote and support research and development on building upon Thailand's innovation in 2016 for the cooperation development projects of the small sized virtual reality simulation shooting range system to serve the research and development on making a prototype a small sized shooting range system to be delivered to commander and staff at battalion level of Royal Thai Armed Force and Department of Special Investigation for testing and trial in 2016.

Action Plan in 2017

DTI determines an important plan in conducting research and development on the prototype of an economical or small sized shooting range in total of 15 systems. Each system consists of an applied program for specifying 4 shooters and score recording program that will record a target shooting score by using a BB gun (TARVO, HK, M16-A1, M16-A2 , AND M16-A4). The BB guns are modified to use air pressure and simulating the recoil of a gun and a shooting range developed by augmented reality technology with a real photo from an actual firing range to support the target shooting of weapon alignment, alignment fixture at a range of 25 meters, alignment fixture at a range of 75 meters, and aimed quick kill target to be delivered to commander and staff at battalion level of Royal Thai Armed Force and Department of Special Investigation for testing and trial in 2017.

3.2 The Basic Format of Virtual Reality Simulation Shooting Range System Research and Development Project

As the DTI Board of Directors and Sub-Committee have given importance to the virtual reality simulation shooting range system, which can be applied to utilize for a weapon training for students of the Armed Forces Academies Preparatory School (AFAPS), the project has been approved to implement the shooting range (with 16 shooting lanes facility) with DTI applying the body of knowledge derived from an existing research and development of virtual reality simulation shooting range system. The project will be available for testing and trial in practicing students of the Armed Forces Academies Preparatory School and officers of Royal Thai Armed Forces.

Action Plan in 2017

DTI determines a major plan to conduct research and development on a basic shooting scene and controller station, development of score recording program and related statistics with primary shooting, development on armed weapons (BB gun, actual M16-A1 and M16-1 rifle with practicing shooting with bolt action rifle that modified to use gas pressure to simulate the recoiling

of a gun) to test at an operational level and operational performance with continuous users in 2018

4. The Unmanned Aerial Vehicle (UAV) Master Plan

The scope of the technology consists of the automatic take-off and landing control for UAVs, detail design, trial and functional test of airborne and ground and underwater system, sensor technology, simulation of the movement pattern and knowledge sharing, and management for military personnel. There are 2 projects scheduled in the master plan under the national budget for the 2017 fiscal year.

4.1 The Fundamental Components of Unmanned Aerial Vehicle (UAV) Research and Development Project

The project includes a study and data collection of fundamental components of UAV, provision of tools and equipment program and fundamental devices, development to increase efficiency and capability and gathering of body of knowledge for research and develop on UAV, detail design and producing movement pattern system and initial plan project of remote and autopilot system, including detection and status evaluation system of UAV. Moreover, the project consists of research and development on communication links and control station system as well as loading equipment and personnel capability in operating UAV in a correct and efficient manner to facilitate research and development according to the strategic planning model of DTI, and meet with requirement of users in units of the armed forces in the future. In addition, the project strengthens research and development on the UAV networks within internal and external authorities while DTI represents as a center providing a standard UAV system by integrating research and development of UAV in Thailand. In the previous years, DTI developed tools and equipment to assist and support actual and simulation practices, detail design and handling a drawing plan of the building used for trial and testing (a blueprint of building renovation for UAV storage station and test, Wing Division 206, Watthana Nakhon District), the renovation of Pilot training center, Office of the Permanent Secretary of Defence (Chaengwattana) and the provision of UAV external pilot training courses (started in 2015), internal pilot and unit commander training courses (started in 2016) by inviting personnel in the Royal Thai Armed Forces and those interested in the training courses. Furthermore, DTI prepared to implement the standard UAV system by aiming to be the National Unmanned Aerial System Standardized Performance Testing Center so as to strengthen and promote the capability of competitiveness of the defence industry in UAV system in 2020.

Action Plan in 2017

DTI has major plans to develop equipments supporting a research and development fundamental components of unmanned aerial system (UAV);development of equipment controlling UAV system both simulation and actual flying; development of unmanned systems training room; provision of internal pilot training course (class of the 1st) and external pilot training course (class of the 2nd) and UAV intermediate tactic rehabilitation training (Tiger Shark III). Besides, DTI prepares to take a prototype of UAV from DTI research and development ;Fixed Wing UAV and Mini UAV to apply for the Military Standard test before expand to integrating UAV system to serve the mission of territorial defence military units and civil sector.

4.2 The Explosive Ordnance Disposal (EOD) Robot Prototype Research and Development Project

Thee research and development on an explosive ordnance disposal robot is majorly aimed to gather all requirements from user units in the military units, and analyze opportunities and obstacles for operation, focusing on creating networks of cooperation from academic institutions, research units and the industry sector to integrate research and development EOD technology, enabling mission efficient responses to meet with users' requirements. DTI had held a seminar to gather all requirements from user units to create connectivity between users and technology developer as well as build up a cooperative network. Relevantly, the seminar reported that an EOD robot is vitally necessary for providing enhanced bomb disposal capabilities to explosive ordnance disposal teams, especially for the mission of solving violence problems in three provinces of the South of Thailand. The existing EOD robots have deteriorated in the quality and the process of repair and maintenance services has to be implemented abroad, taking a considerable amount of time as well as high cost. As a result, a guideline to proceed with research and development on DTI EOD robot with the cooperation of academic institutions, research units and the domestic private sector having a wide range of knowledge and technology base and readiness in building onto the existing technology has been originated to develop an EOD robot in accordance with government policy to meet with users' requirements.

Action Plan in 2017

DTI implements an analysis study of detail design and development of an EOD robot prototype by integrating the existing of body of knowledge and technology with the cooperation of external authorities, having wide range of capabilities to design and develop a small prototype of EOD robot for trial and testing of the preliminary utilization as well as studying and implementing a standard of EOD robot to prepare readiness for the qualification test of the prototype. In addition,

Robot Assembly and Maintenance Facility Ph1 enhances the capability of DTI and responds to the repair and maintenance requirement of user units.

5. The Combat Vehicle Technology and Weapon System Research and Development Project

The scope of the technology consists of driving propulsion system of special materials for combat vehicles, weapon systems in both semi-auto and automatic system, remote-controlled weapon system mounted on ground combat vehicles and amphibious combat vehicles. There are 3 projects scheduled in the master plan under the national budget for the 2017 fiscal year as follows :

5.1 The Wheeled Armored Vehicle Research and Development Project

The policy from the Ministry of Defence recognizes the importance to utilize combat vehicles and weapon systems, which plays an important role in Thailand's military operational process, especially the armored vehicles. Thus, DTI is assigned to take responsibility for designing and developing jointly with the government, private sector and automotive industry as Thailand is considered the center of vehicle producers in the top rank of the world. The project was aimed to be used in application and extension of related technologies for the armored vehicle development for the armed forces under the Memorandum of Cooperation between the Royal Thai Army and DTI on November 24, 2015. DTI conducted research and development on the 8x8 wheeled armored vehicle, including preliminary design and building of a full-scale mock up of an 8x8 wheeled armored vehicle for further improvement and development on future prototype production of the 8x8 wheeled armored personal carrier, which were accomplished in 2016. DTI has carried out a test of working standard in 2017. The Royal Thai Army has determined to install a necessary subsystem such as the weapon system, fire defence system, electronic camouflage system including solving the problem of overpressure prevention system (Trim Vane) and the improvement of compartment lids (Trooper Hatch) and other necessary subsystems before trial and testing. The armored vehicles then will be carried out the military equipment standard test of the Royal Thai Army before putting in service.

Action Plan in 2017

The DTI Committee has approved to proceed with the installation of necessary subsystem on February 22, 2017 by scheduling an important operational plan to amend the MoU on research

and development between Royal Thai Army and DTI for the prototype of armored vehicle, research and development of overpressure prevention (Trim Vane), the improvement of compartment lids (Trooper Hatch), fuel tank and launching pad of rear gun, fire fighting system, night vision scope system and electronic camouflage system to be mounted on the prototype of 8x8 wheeled armored vehicle that DTI has developed in 2017 for trial and testing with user units on the military equipment standard of the Royal Thai Army in 2018, accordingly.

5.2 The Wheeled Armored Vehicle to Support the Mission of Royal Thai Navy Research and Development Project

As DTI has proposed the research and development project on the 8x8 wheeled armored vehicle to Royal Thai Navy through Naval Research & Development Office (NRDO) for Royal Thai Marine Corps (the user unit) as specified in the military doctrine 2 to have the 8x8 wheeled armored vehicle that DTI has developed with the application and extension of related technologies to of the 8x8 wheeled armored amphibious combat vehicle (ACV) prototype in order to support the mission of Royal Thai Navy. DTI signed the Memorandum of Understanding (MoU) on research and development cooperation of the wheeled armored vehicle for the mission of Royal Thai Navy on May 17, 2016 and joined with user units in determining detail design and specification of a prototype being applied to develop other component parts to make the 8x8 wheeled armored amphibious combat vehicle (ACV) for the mission of Royal Thai Army (to be continued in 2017).

Action Plan in 2017

DTI is in the process of implementing research and development on component parts the subsystem of wheeled armored vehicle (weapon system, communication system and protection system) to install and assemble with the prototype of 8x8 wheeled armored vehicle that has been continually developed from the previous year before implementing operational test and primary working status for readiness to facilitate the military equipment standard of the armed forces before delivering to Royal Thai Navy in 2018, accordingly.

5.3 The Remote Control Weapon System Research and Development Project

The Remote Control Weapon System (RCWS) is a weapon system operated with a control at a long distance between a weapon and its control weapon system. DTI will conduct research and development being able to respond to the requirements in the operational process of different combat vehicles in accordance with the mission of each unit. The day and night observation system, thermal image and stabilization system during firing have been installed in order to utilize

weapons during movement and keep tracing with a target at all time. This can increase the efficiency of Royal Thai Armed Forces combat vehicles and can fight and attack threats more quickly and precisely and being able to minimize the dependency on foreign technologies. During the past years, DTI studied and designed an analysis of subsystem as well as research and development of the weapon remote control system, fire control system at phase 1 (comprised of the study of weapon remote control system both domestic and foreign countries, design and testing concept for using in making a prototype of fire control system, target searching system, weapons-movement-targets system, target tracking system, ammunition firing calculation, lead angle calculation, mechanism of the recoil of a gun, trigger pulling, and mechanism of machine guns in general), and research of the conceptual observation radar.

Action Plan in 2017

DTI schedules a master plan in conducting research and development on a prototype of the weapon remote control system platform jointly with Faculty of Engineering, Kasetsart Universitiy and the private sector holding high capabilities, which is an ongoing project from the previous years, while development on fire control system is also implemented at phase 2 (consists of ammunition firing calculation, weapons-movement-targets system, the stabilization of weapon during firing, status of battle on a map, communication system and encoding system) as well as development on a prototype and installation of tactical fire control system and a prototype of tactical visual/data display mounted on a platform so as to acquire a prototype of weapon remote control system capable of target tracking in 2017.

6. The 30 mm Ammunition and Primer to Production Line Research and Development Project

Regarding an urgent policy issued by the high commander of the armed forces that expects an application and extension of the existing 30 mm ammunition and primer to a standard production line since Royal Thai Army and Royal Thai Navy proceeded with the provision of BTR-3, an 8x8 wheeled armored personnel carrier in 2013 with the 30 mm automatic cannon. Therefore, it is necessary that the armed forces require the ammunition of 30 mm cannon for both tactical utilization and training practice for the benefit of weapon familiarity and prepare readiness according to the military doctrine. At present, the provision of the ammunition has to depend on the supply from foreign countries at a high cost. DTI then initiates research and development to make a prototype of the 30 mm ammunition for the size of 30x165 mm and 30x173 mm with

the international standard quality to be ready for a production line by applying the program called Product Lifecycle Management to acquire an engineering standard to make a 30 mm ammunition prototype to use weapon system in Royal Thai Armed Forces. During the past years, DTI studied the possibility of the project and put this research in a fundamental research by starting with making a Non Discloser Agreement (NDA) with a private company whose expertise is in the conceptual design to develop a process of making and assembling a prototype of 30 mm ammunition for 1,000 shots for trial and testing by the user units.

Action Plan in 2017

DTI schedules a master plan in conducting research and development on producing the 30x165 mm ammunition to be delivered to the user units for trial and testing, performance evaluation, and handling an instruction manual of the prototype other related manuals to be delivered to units of users, including development on the military industry standard in prepare the prototype of 30x165 mm ammunition for commercial production line in the future.

Strategy 2 Knowledge and Innovation Development to the Public

The objective of Ministry of Defence and Thailand is to develop the capabilities of development and preservation as well as to extend defence technology continually in a sustainable manner, including being able to transfer knowledge to the public in all dimensional application for both commercial, academic and national security purposes. The projects are as follows:

1. Database Development and Informative Publication

DTI continues to develop reliable and informative knowledge management system, assessment, exchange, collecting, distribution and safety system on defence technology information and strategies for related units under the Ministry of Defence. Moreover, DTI provides security related information and Defence Technology database and publicize analytical information to the Ministry of Defence and stakeholders in order to gain DTI's recognition.

Action Plan in 2017

DTI schedules an important plan to collect and organize analytical information on defence technology so as to support research and development projects according to the policies stated

in the report of the the 4th quarter analysis on defence technology to present to Minister of Defence, Executives in Ministry of Defence, and Management executives of DTI, report of the feasibility of research and development project for supportive information for the consideration of management executives, data collection and analytical articles about defence technology, defence industry, and military news, concerning national security and defence technology published through journals or the DTI website, including knowledge application from analytical articles for research and development of DTI according to the suggestion of the DTI Committee.

2. The Academic Publication Project

The aim of this project is to publish DTI research in the form of academic publications at national and international levels in order to create the research network.

Action Plan in 2017

DTI schedules an important plan to publish academic articles through the academic network as well as to publish information and research activities through various media so as to develop DTI researchers to acquire knowledge and expertise in related fields.

3. The Personnel Development in Academia, Industry and Private Sector Project

The project is aimed to proceed with science and defence technology curriculum at graduate courses so as to develop and produce personnel in defence technology field to respond to requirement of government authorities, private sector and technology industry sector in terms of providing studying activities as well as scholarships related to cooperation seeking with academic institutes both domestic and international level to support DTI research implementation. In addition, DTI joins academic lectures and seminars with the Armed Forces and academic institutions on the topic of defence technology at an international level.

Action Plan in 2017

DTI schedules an important plan in co-management of a course for Defence Engineering by providing researcher or officer of DTI to be a special lecturer or professor in the course, supportive fund for research and development project and thesis concerning technology that can be applied to serve the benefit of research and development of DTI.

DTI also offers scholarships and grants for the course of Defence Engineering for military officers and civil service in order to produce personnel with the competency of defence technology. DTI holds seminars, giving lectures to academic institutions and the armed forces colleges on defence technology. DTI continues to seek cooperation from academic institution at both national and international levels for academic and research benefits so as to develop an opportunity to conduct research with the Thailand Research Fund (TRF) to support the Royal Golden Jubilee Ph.D. Program.

Strategy 3 Developing the Networks of Cooperation

The policy of Ministry of Defence is aimed to enable the management of development and application of knowledge and defence technology resources to efficiently and effectively serve the defence technology industry and the national economy. The important projects under this strategy in 2017 are as follows :

1. The Cooperation in Research and Development with Various Sectors Project

Cooperation management with government and private sectors in implementing projects in accordance with the DTI master plan is conducted in response to the requirements of the Armed Forces by emphasizing on creating cooperation in research and development, supported by the military research and development office to produce military prototypes for trial and testing.

Action Plan in 2017

DTI schedules a plan in creating the network of cooperation by participating in several activities held by Ministry of Defence in the event called Defense & Security 2015 which is the event showing the military forces the weapons and equipment at an international level so as to publicize research and development of DTI to targeted groups or stakeholders. DTI participates in road show activities, presenting DTI missions and important work pieces to create better understanding and reputation of DTI to targeted authorities, operational seminar with the military research and development office of the Armed Forces and user units to study the requirement of military weapons and equipment in service, cooperative activities with the Armed Forces and external research authorities to seek cooperation and create the network for domestic research.

2. Public Relations

DTI continues to publicize information, progresses and activities of research and development targeted groups via mass media to build reliability and good attitude towards DTI and create supportive and cooperation practice in research and development from external authorities. This also builds a good image and reputation of DTI to be "an organization who plays an important role in promoting the stability of military weapons and equipment for the country with sustainable self reliance"

Action Plan in 2017

DTI will implement public relations mission and major work pieces to build recognition and good image to the public through mass media such as television, radio, and social media. The media is very popular among Thais and has a major influence on consumers. DTI also holds an event on the yearly anniversary of DTI in accordance with the policy of the organization.

3. The Corporate Social Responsibility Project

In order to build the positive image of the organization, DTI has conducted corporate social responsibility activities, which allows DTI to gain cooperation and support from external authorities and the society by giving importance to educational support and science technology development among Thai youths.

Action Plan in 2017

DTI schedules a plan to conduct corporate social responsibility activities continually such as scholarship presentation ceremony to children of government officials in the working area, science camp activities for making hand-made inventive rockets by applying knowledge to Thai youths who join the activities. Moreover, knowledge sharing is essential to create innovation or scientific work pieces in the future.

Strategy 4 Developing DTI on Self-Reliance

DTI aims to implement the organization with good governance practice, efficiency and transparency with excellence in academic specialization, being the organization providing knowledge. The high competency of the personnel are qualified as scholar, integrator and management administrator and have infrastructure in accordance with the operation process of the institute associated with major projects in 2017.

1. Organizational Culture

In order to enhance and promote the organizational culture, DTI promotes six cores values of organization which are "Achievement-Oriented, Honesty, Customer Satisfaction, Continuous Improvement and National Benefit is the first priority".

Action Plan in 2017

DTI recognizes the organizational values and raises awareness to its officers and management executives by publishing internal journals and organizing activities to encourage unity and participation for all levels of personnel. The officers and management executives follow the organizational values and become an everyday practice. The values will become ignited in the mind and become the organizational culture, which can be transferred to those participated in such activities to learn and understand the moral and ethics aspects. The organizational values will put DTI forward to become the organization with transparency and good governance practice efficiently.

2. Human Resource Development

Human resource is considered as one of the key success factors of the organization. DTI elaborates Human Resource management by organizing personnel development training, aiming significantly to encourage and promote working capability based on the necessity according to the job description, specialized training that can enhance knowledge and working skills, including individual development for the maximum efficiency.

Action Plan in 2017

DTI schedules personnel training and development plan in 3 levels: Executive level, Functional level, and Individual development plan and development of knowledge for personnel in science and defence technology field by measuring key performance indicators of satisfaction, the knowledge transfer among colleagues to ensure that the training will be successful and worth the budget spent.

3. Basic research project

DTI has been supporting research and development for the Ministry Of Defence in applied research. This requires the basic research by utilizing knowledge in science and technology that would consequently lead to innovative output and products. Currently, DTI proceeds with academic documents as a tool in development and enhancing the research capabilities. However, supportive equipment are still inadequate in conducting basic research, which considered being an important foundation for researchers to enhance their capabilities with continuity to increase the quality of their research works to get the same level of recognition among research and development agencies at both national and international levels.

Action Plan in 2017

DTI schedules a plan to utilize all the knowledge derived from research to develop extensively and to apply in research and development according to the DTI master plan. The activities consists of research and development on basic research of Infrared seeker technology (IR Seeker), research and development on vehicle tracking status with RFID and GPS technology, research and development on Tactical Data Link (TDL), research and development on military radio communication (Ruggedized Cognitive Radio), research and development on a prototype of Automatic suspect vehicle recognition (AVSR), research and development on troop tracking system, research and development on thermal battery, research and development on rocket motor and insulator, research and development on electric squibs on telescope system to be applied to the spectrophotometer, research and development on targeted camera positioning technology, and research and development on a prototype of the electric multirotor helicopter operated by fuel cells.

Audit and Financial Report

For the fiscal year of 2016

Audit and Evaluation Committee Report
Defence Technology Institute (Public Organization)
For the fiscal year of 2016

The Board of Director of the Defence Technology Institute (Public Organization) has appointed the Audit and Evaluation Committee on 3 December 2015 consisting of Finance, Accounting, Budget, Audit and Risk management Expert as a Chairman of the Board of Sub-Committee and four Experts as Sub-Committees in order to support the Board of Director of the Defence Technology Institute monitoring the good governance, The Audit and Evaluation Committee has been appointed by the Board of Director of DTI to support the Board of Director in monitoring the good governance, internal monitoring system, risk management and appropriate audit in accordance with transparency and reliability of financial reporting.

In the fiscal year of 2016 the Audit and Evaluation Sub-committee had audited and evaluated annual budget report of Defence Technology Institute (Public Organization) with twelve meetings and the resolutions is as follows ;

1. Auditing finance and accounting of DTI by emphasizing on verifiableness, accountability and transparency, providing observation and recommendation on internal audit, internal control, accounting report and providing a policy for finance and account management of the organization in accordance with good governance principles.

2. Auditing adequacy of internal audit system by auditing internal audit report of 2012 which executed by internal auditor in accordance with State Audit Commission Rule on B.E. 2544 (2001).

3. Auditing adequacy of risk management by auditing risk management report proposed by executives, providing observation and recommendations for the executives to adjust the organization performance to reach the expected goal

4. Controlling Internal Audit performance to be in accordance with internal audit standard by encouraging Human Resource development as well as providing recommendation about report and comprehensive internal auditing.

4.1 Proposing audit policy, Terms of Reference, auditing audit plan and audit report of Internal Auditor by considering and approving audit plan of 2017 fiscal year before proposing to the Executive Committee for approval. Moreover, The Audit and Evaluation Sub-Committee also approved Audit Plan comprising of procurement, finance and accounting, inventory, budget as well as auditing audit performance of fiscal year of 2016.

4.2 Auditing and evaluating audit output of internal audit, recommendations of internal auditors and auditors as well as Executives in order to provide recommendations for the executives to adjust the organization performance by

4.2.1) Auditing and evaluating procurement by providing recommendation for the executives to correct deficiency of enterprise resource planning system (ERP) used for procurement procedure to be in an efficient

manner and in accordance with procurement regulations.

4.2.2) Auditing and evaluating the output of finance and accounting by providing recommendation about accounting recording to be in accordance with standard and accounting principles and policies and proposing an audit of budget spending in a cost effective manner.

4.2.3) Auditing and evaluating the output of inventory by providing recommendation about implementing of inventory registration forms to be responded to data of account department and random sampling method.

4.2.4) Auditing and evaluation the output of budget management by providing recommendation about implementing a budget disbursement report by quarterly and yearly.

4.2.5) Auditing budget draft of 2015 before forward to an auditor of the organization including auditing and evaluating the output of improvement according the auditor's recommendation.

The Audit and Evaluation Subcommittee has performed the duties independently and equitably with good governance, internal monitoring system, risk management and appropriate audit in accordance with transparency and reliability of financial reporting. To achieve a successful working performance, the Audit and Evaluation Subcommittee has to cooperate with related departments in conforming to the rules, adjusting to recommendations as well as supporting internal auditing report by specifying structure, personnel and adequate resources management so as perform efficiently and effectively.

(Mrs. Puntip Suratin)

Chairman of Audit and Evaluation Sub-Committee

20 June 2017

Report of Auditor
Office of the Auditor General

To: The Board of Director of Defence Technology Institute

The Office of Auditor General have audited financial statements as of 30 September 2016, which are the financial statement of, income statement, statement of Net Assets/Capital and cash flow of the each year ending of Defense Technology Institute (Public Organization), of which the executives of DTI is responsible for accuracy and completeness of the information in these financial statements whereas the Office of the Auditor general has responsibility of comment on a result of documents examination.

Office of the Auditor General had audited in accordance with an audit standard which specifies Office of the Auditor General has to plan and inspect whether the financial statement contrast to facts, inspect necessary evidence in form of amount of money or budget reveal, assess appropriate accountancy method of Defence Technology (Public Organization) and estimate significant financial data composed by the executives as well as the evaluation of financial lists. Office of the Auditor General affirms audit appropriately.

Office of the Auditor General considered that the statement of financial position as of 30 September 2016, the financial performance and the statement of cash flow of the each year ending of Defence Technology Institute (Public Organization) were correct as accounting principles of the Ministry of Finance.

(Miss Yenta Kornvichitkul)

Director of the 12th Auditor Office

(Miss Boonyarak Nuamjit)

Group Director

สำนักงานการตรวจเงินแผ่นดิน

วันที่ 24 มีนาคม 2560

Defence Technology Institute (Public Organization)

Financial Statement

As of 30 September 2016

(Unit : THB)

	Note	2016	2015
Assets			
Current Assets			
Cash and cash Equivalents	5	1,222,654,286.17	841,131,815.55
Receivable	6	6,108,362.17	14,683,250.58
Account interest Receivables		7,578,610.65	9,487,834.75
Short-term investment	7	200,000,000.00	200,000,000.00
Equipment inventory	8	91,787,614.06	110,366,950.12
Cash Advances	9	-	2,823,833.00
Installment		152,875,182.78	90,427,449.17
Other Current Assets	10	1,331,829.65	2,123,379.13
Total Current Assets		1,682,335,885.48	1,271,044,512.30
Non-Current Assets			
Research and Development Workshop	4.5, 11	251,543,421.13	288,514,755.88
Other Infrastructure Assets	4.5, 12	24,741,688.14	25,214,984.01
Work under construction	4.5, 13	5,989,273.53	2,129,349.53
Office renovation (Net)	4.5, 14	178,050,161.45	168,080,668.33
Fixed Assets (Net)	4.5, 15	481,719,246.78	565,829,363.87
Intangible Assets (Net)	4.6, 16	153,629,273.05	166,324,077.80
Total Non-Current Assets		1,095,673,064.08	1,216,093,199.42
Total Assets		2,778,008,949.56	2,487,137,711.72

Defence Technology Institute (Public Organization)

Financial Statement

As of 30 September 2016

(Unit : THB)

	Note	2016	2015
Liabilities			
Current Liabilities			
Account Payables		108,245,942.85	38,364,175.01
Accrued Expenses	17	7,532,205.39	12,271,272.61
Other Current Liabilities	18	27,874,155.70	25,652,287.58
Total Current Liabilities		143,652,303.94	76,287,735.20
Total Liabilities		143,652,303.94	76,287,735.20
สินทรัพย์สุทธิ/ส่วนทุน		2,634,356,645.62	2,410,849,976.52
Net Assets	19		
Capital		499,060,766.45	499,060,766.45
Retained Earnings		2,135,295,879.17	1,911,789,210.07
Total Net Assets		2,634,356,645.62	2,410,849,976.52

Footnotes to financial statement is a part of this financial statement

General

(Sompong Mukdaskul)

Director-General of Defence Technology Institute

(Mr. Srijaroung Bandhaya)

Deputy Director-General

Defence Technology Institute (Public Organization)

Income Statement

As of 30 September 2016

(Unit : THB)

	Note	2016	2015
Revenue			
Budget	20	1,204,323,100.00	1,081,089,400.00
Interest		27,552,096.26	46,785,508.25
Revenue from other sources		3,916,754.44	7,265,407.49
Total revenue		1,235,791,950.70	1,135,140,315.74
Expenses			
Employee expenses	21	228,226,942.77	208,712,816.83
Operating expenses	22	137,732,248.60	125,658,447.76
Project expenses	23	419,975,032.30	739,787,747.87
Depreciation and Amortization	24	243,539,201.81	222,185,661.60
Loss of property disposal		-	8,620,283.39
Lost (Benefit) from currency exchange		(3,804,815.92)	205,126.62
Total Expenses		1,025,668,609.56	1,305,170,084.07
Net Income		210,123,341.14	(170,029,768.33)

Footnotes to financial statement is a part of this financial statement

Defence Technology Institute (Public Organization)

Statement of Net Assets/Capital

As of 30 September 2016

(Unit: THB)

	Capital	Income	Net Assets
Balance as of 30 September 2014 - Reported	499,060,766.45	2,081,740,478.40	2,580,801,244.85
Accumulated correction	-	78,500.00	78,500.00
Balance as of 30 September 2014 - Revised	499,060,766.45	2,081,818,978.40	2,580,879,744.85
Asset Capital changes in 2015			
Income higher than installment	-	(170,029,768.33)	(170,029,768.33)
Balance as of 30 September 2015	499,060,766.45	1,911,789,210.07	2,410,849,976.52

Defence Technology Institute (Public Organization)

Statement of Net Assets/Capital

As of 30 September 2016

(Unit : THB)

	Capital	Income	Net Assets
Balance as of 30 September 2015 - Reported	499,060,766.45	1,911,789,210.07	2,410,849,976.52
Accumulated correction	-	13,383,327.96	13,383,327.96
Balance as of 30 September 2015 - Revised	499,060,766.45	1,925,172,538.03	2,424,233,304.48
Asset Capital changes in 2016			
Income higher than installment	-	210,123,341.14	210,123,341.14
Balance as of 30 September 2016	499,060,766.45	2,135,295,879.17	2,634,356,645.62

Defence Technology Institute (Public Organization)

Statement of Cash flow

As of 30 September 2016

(Unit : THB)

	Note	2016	2015
Cash Flow from Operations			
Net Income		210,123,341.14	(170,029,768.33)
Adjusted to cash ow from operations			
From operational activities :			
Transfer back of previous year expenses		(37,326.41)	78,500.00
Depreciation and Amortization		243,545,522.14	222,185,661.60
Non-monetary expenses Transfer of rocket building to army		21,778,065.17	
Return the rest of pay the last year		(826,835.31)	-
Lost of property disposal		-	8,620,283.39
Benefit (Lost) not due from currency exchange.		(1,407,215.08)	1,197,313.21
Income higher than operations expense Before asset and liabilities changes		473,175,551.65	62,051,989.87
Operation Assets write up (write down) :			
Short-term Receivable		8,574,888.41	(10,949,814.50)
Accrued Interest		1,909,224.10	2,081,065.85
Supply Inventory		18,579,336.06	(15,102,896.00)
Advance payment		2,823,833.00	3,061,268.00
Installment		(52,466,733.61)	(28,220,936.97)
Other Current Assets		791,549.48	(439,921.77)
Liabilities write up (write down) :			
Payable		71,288,982.92	21,221,705.03
Accrued Expense		(4,739,067.22)	6,056,817.98
Other Current Liabilities		2,221,868.12	12,689,652.90
Net Cash Flow from Operations		522,159,432.91	52,448,930.39

Defence Technology Institute (Public Organization)

Statement of Cash flow

As of 30 September 2016

(Amount : THB)

	Note	2016	2015
Cash Flow from investing activities			
For Research and Development Workshop		-	600,000,000.00
For land adjustment		(372,197.93)	(22,128,065.17)
For other Infrastructure Assets		(1,089,000.00)	-
For Building renovation		(3,859,924.00)	1,180,440.37
For durable goods purchasing		(19,870,304.09)	(23,787,185.38)
For Fixed Assets		(98,900,566.07)	(195,678,928.75)
From Fixed Assets		-	800,000.00
For other Non-Current Assets		(16,544,970.20)	(49,438,657.80)
From other Non-Current Assets		-	384,000.00
Cash flow from make money activities		(140,636,962.29)	311,331,603.27
Cash flow from financing activities			
Cash (earned) :			
Budget (transferred from Defence Science and Technology Department)		-	-
Cash flow used for activities		-	-
Cash and cash equivalent		381,522,470.62	363,780,533.66
Cash and cash equivalent (Brought forward)		841,131,815.55	477,351,281.89
Cash and cash equivalent as of year-end		1,222,654,286.17	841,131,815.55

Footnotes to financial statement is a part of this financial statement

Defence Technology Institute (Public Organization)
Notes of Financial Statement
As of 30 September 2016

Remark 1 Background, establishment and objective

Defence Technology Institute (Public Organization) or DTI is a juristic person established on 1 January 2009. The institution was established under the provision of the Royal Decree regarding the establishment of Defence Technology Institute (Public Organization) authorized by the Article 187 of the Constitution of the Kingdom of Thailand and Article 5 of the Public Organization Act of 1999. Defence Technology Institute is considered as the first public organization under the supervision of Ministry of Defence with the following objectives :

1. Research and develop large-scale military equipment and defence technology.

2. Be the defense technology center for the Ministry of Defence to provide defence science and technology information so as to formulate defence policies.

3. Collaborate in defence science and technology with public and private sectors, educational institutions domestically and internationally.

4. Promote and support the defence science and technology training, research, and human resource development

5. Be a center of providing information on defence science and technology to the public, and promoting academic activities in order to publicize defence science and technology knowledge.

On 6 May 2010, the Cabinet had a resolution to transfer entities, assets, rights, liability and budget of Defense Science and Technology Offce related to the Missiles Research and Development for National Security Master Plan (2007-2016) including Long-Range Missile Research and Development project, and Missile Research and Development for National Security project to DTI as stated in the Secretariat of the Cabinet document No.0505/7715 on 7 May 2009 in accordance with the provision of Article 9 of Public Organization Act of 1999.

Remark 2 General information

2.1 Address

Defence Technology Institute (Public Organization), Ministry of Defence, 47/433 Moo 3, Chaengwattana Road, Banmai Sub-district, Pak Kret district, Nonthaburi. The location of the institute has been authorized according to the official document no. Kor Hor 0215/1459 dated

September 16, 2008 and the official document no. Kor Hor 0207/489 dated January 29, 2015, item 2.4.6 approving Defence Technology Institute to use the SP building (Chaengwattana) entirely, and allow SP to also use the building.

2.2 The Royal Thai Army have been permitted to use the Operational Workshop 1 in the area (approximately 270 Rai) within the Military Explosives Factory, Defence Industrial Department, Defence Industry and Energy Centre, Yan Mat Ri, Phayuha Khiri, Nakhon Sawan.

2.3 The Operational Workshop 2 has been authorized to be used under the supervision of the Office of the Permanent Secretary of Defence within the area (approximately 27 Rai) of the Center for the Production of Weapons, Defence Industry and Energy Centre, 14 Moo 5 Khao Sam Yot sub-district, Mueang, Lop Buri.

Remark 3 Basis of preparation of financial statements

Financial statement of accrual basis is in accordance with principles of accounting policies for government agencies No. 0423.2/237 of 8 September 2014.

Remark 4 Accounting Policy

4.1 Accounting period of DTI is a fiscal year starting from 1 October to 30 September of the following year.

4.2 The stock shown in original costs and calculating the stock prices prior to utilizing

4.3 The stock shown in original costs or net prices depending on which one is lower. The buying budget consists of buying prices and direct expenses related to specific goods, for example, VAT, logistics costs, excluding discounts and refunds.

4.4 Records concerning foreign monetary are required to be converted into Thai baht using the Krung Thai Bank's money exchange rates on the day of the operation. Assets and loans in any foreign monetary form are also required to be converted into Thai baht using the Krung Thai Bank's money exchange rates on the day of the operation. Profits and losses occurred and altered from foreign monetary payments are required to be recorded immediately.

4.5 The Office Building and Facilities

The office building including renovated areas are shown in net prices as in the original costs on the day of the accumulated depreciation evaluation. Productions in renovation are

shown in the original costs. All assets valued less than 5,000 baht per unit shown in both prices and years in service are recorded in the durable articles register.

4.6 Intangible assets consist of computer programs, computer systems and DTI-1 body of knowledge.

4.7 Depreciation and distribution prices are recorded in the spending budget to show the financial operation calculated by straight-line method according to the products' years in service in accordance with the accounting principles and policies for government agencies. The service years for each asset are shown as follows:

Category	Service years	Percentage
Operational workshops	20	5
Renovated areas	20	5
Infrastructure assets	20	5
Office related durable articles	10	10
Electronic and radio durable articles	5	20
Vehicles and buses	5	20
Commercial and publishing durable articles	5	20
Factory durable articles	5	20
Construction durable articles	10	10
Science related durable articles	5	20
Computer durable articles	4	25
Educational durable articles	2	50
Indoor durable articles	5	20
Outdoor durable articles	5	20
Sports/physical durable articles	5	2
Medical Sciences durable articles	5	20
Other durable articles	10	10
Computer programs	4	25
The DTI-1 Phase 1 Body of Knowledge	15	6.67

Remark 5 Cash and Cash Equivalents

(Unit : THB)

	2559	2558
Petty cash	400,000.00	400,000.00
Bank Deposit		
Saving account	522,254,286.17	340,731,815.55
3 month Fixed Deposit account	700,000,000.00	500,000,000.00
Total cash	1,222,654,286.17	841,131,815.55

Remark 6 Short-term receivables

(Unit : THB)

	2559	2558
Cash Advance loan debtor	5,771,653.96	10,775,630.60
Subsidied income receivables	-	3,863,900.00
Other receivables	336,708.21	43,719.98
including short-term receivables	6,108,362.17	14,683,250.58

Loan Debtors by Year are as follows:

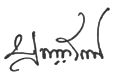
(Unit : THB)

Loan debtor borrowed funds	Not yet due and sending the certificate	Amount due and sending the invoice	Overdue and the invoice sent	Total
2559	2,985,152.00	-	2,786,501.96	5,771,653.96
2558	3,898,703.20	-	6,876,927.40	10,775,630.60

Remark 7 Short-term Investment

(Unit : THB)

	2559	2558
12 month Fixed Deposit account	200,000,000.00	200,000,000.00
Total Short-term investment	200,000,000.00	200,000,000.00



Remark 8 Stock

(Unit : THB)

	2559	2558
Raw materials	34,715,743.18	37,922,014.27
SKD	44,503,285.13	44,517,944.13
Factory components	4,338,466.73	12,729,333.35
Consumable	8,230,119.02	15,197,658.37
Combined stock	91,787,614.06	110,366,950.12

Remark 9 Advanced Payment

(Unit : THB)

	2559	2558
1. 15% Advance payment of the total contract amount of 9.50 million baht to procure a mobile command & communication systems contract no. 57 / CTH00067 dated September 30, 2014	-	1,425,000.00
2. 15% Advance payment of the total contract amount of 9.50 million baht to procure a mobile command & communication (phrase 2) systems contract no. 58/CTP00017 dated January 21, 2016	-	1,185,000.00
3. 100% Advance payment of the total contract amount of 0.21 million baht to procure water pipes and meters at the Research and Development Operation Center 1 in Nakhonsawan contract no. 57/CTH00106t dated September 14, 2015	-	213,833.00
Total Advance Payment	-	2,823,833.00

Remark 10 Other Current Assets

(Unit: THB)

	2559	2558
Advance Expenses	1,180,846.08	2,083,107.70
Advanced Payment of Insurance Premium	150,983.57	40,271.43
Total	1,331,829.65	2,123,379.13

Remark 11 Research and Development Workshop

(Unit : THB)

	2559	2558
Cost	311,434,461.63	332,840,328.87
Minus Accumulated depreciation	(59,891,040.50)	(44,325,572.99)
Total	251,543,421.13	288,514,755.88

Remark 12 Other infrastructure assets

(Unit : THB)

	2559	2558
Original costs	31,346,476.64	30,257,476.64
Excluded accumulated depreciation costs	(6,604,788.50)	(5,042,492.63)
Construction of the Ministry of Defence operation office building	24,741,688.14	25,214,984.01

Remark 13 Productions under renovation

(Unit : THB)

	2559	2558
Construction of Research and Development Workshop in Nakhonsawan	1,846,695.00	285,000.00
Construction of Research and Development Workshop in Lopburi	1,584,400.00	197,800.00
Construction of the Officers' Housing Units	112,149.53	112,149.53
Construction of Office of the Permanent Secretary of Defence	1,492,029.00	1,534,400.00
Construction of the Ammunition Warehouse/Depot	954,000.00	-
Construction of Rockets Manufacturing in Nakhonsawan		
Total Production under Construction	5,989,273.53	2,129,349.53

Remark 14 Areas in Renovation

(Unit : THB)

	2559	2558
Renovation of Office and Operating building		
Original prices	212,574,203.76	192,703,899.67
Excluded accumulated depreciation costs	(34,524,042.31)	(24,623,231.34)
Total net prices of renovation	178,050,161.45	168,080,668.33

Remark 15 Durable Articles–Net

(Amount : THB)

	2559	2558
Cost	1,073,209,874.64	974,309,308.57
Minus Accumulated depreciation	(591,490,627.86)	(408,479,944.70)
Total	481,719,246.78	565,829,363.87

Remark 16 Intangible Assets

(Unit : THB)

	2559	2558
Knowledge of DTI Phase I		
Cost	161,589,771.00	161,589,771.00
Minus Accumulated depreciation	(61,282,071.99)	(50,504,034.33)
	100,307,699.01	111,085,736.67
Computer Program		
Cost	106,903,121.93	90,358,151.73
Minus Accumulated depreciation	(53,581,547.89)	(35,119,810.60)
	53,321,574.04	55,238,341.13
Total	153,629,273.05	166,324,077.80

Remark 17 Deferred Expenses

(Unit : THB)

	2559	2558
Deferred Utility Expenses	-	780,086.35
Deferred Audit Fees	600,000.00	600,000.00
Deferred Expenses	6,932,205.39	10,891,186.26
Total	7,532,205.39	12,271,272.61

Remark 18 Other Current Reliabilities

(Unit : THB)

	2559	2558
Income tax withholding for delivery	329,166.35	517,370.95
The Revenue Department creditors	2,268,172.62	8,866,433.61
Contract guarantee	24,225,673.23	14,814,560.94
Performance guarantee	100,000.00	-
Advance Transfer	570,829.83	802,946.69
Other current reliabilities	380,313.67	650,975.39
Total current reliabilities	27,874,155.70	25,652,287.58

Remark 19 Budget

(Unit : THB)

	2559	2558
Capitol tees	499,060,766.45	499,060,766.45
Income higher than gross accumulated expenses	1,911,789,210.07	2,081,740,478.40
Plus improving errors recorded the previous year	13,383,327.96	78,500.00
Plus high income lower than periodic expenses	210,123,341.14	(170,029,768.33)
Total income more than periodic expenses	2,135,295,879.17	1,911,789,210.07
Total Amount of Budget	2,634,356,645.62	2,410,849,976.52

Remark 20 Income from Fiscal Budget

(Unit : THB)

	2559	2558
General Income		
Personnel Expenses	236,655,300.00	219,410,000.00
Operational Expenses	83,460,900.00	65,858,000.00
Investment Expenses	691,369,300.00	27,185,000.00
Project Expenses	178,788,600.00	758,202,500.00
Costs to Subsidize Other Operations		
Economy Stimulating Measures	14,049,000.00	6,570,000.00
Small Investment Stimulating Measures	-	3,863,900.00
Total Income from Fiscal Budget	1,204,323,100.00	1,081,089,400.00

Remark 21 Personnel Expenses

(Unit : THB)

	2559	2558
Salaries	196,118,695.11	181,531,339.54
Overtime	408,357.37	357,560.75
Wages	181,253.16	172,812.00
Dismissal Compensation Case	1,157,300.00	621,528.00
Contribution Fund	9,796,904.50	8,468,674.41
Education Financial Assistance	1,774,983.07	1,667,336.82
Medical Financial Assistance	12,275,346.47	11,302,903.73
Form Expenses	1,109,126.40	1,041,326.37
Health Insurance	2,704,396.36	2,211,975.98
Rents	1,020,000.00	1,040,166.67
Other Personnel Expenses	1,680,580.33	297,192.56
Total Income from Fiscal Budget	228,226,942.77	208,712,816.83

Remark 22 Operational Expenses

(Unit : THB)

	2559	2558
Sales	734,988.30	-
Compensation	7,528,500.00	6,939,470.00
Costs occurring from meetings	1,387,502.81	1,706,994.02
Costs occurring from domestic business trips	12,155,219.47	10,832,802.23
Costs occurring from abroad business trips	8,148,657.49	7,876,688.65
Training costs	10,127,562.72	9,797,341.13
Leisure costs	1,163,361.06	1,355,520.80
Ceremonial costs	344,069.00	266,705.60
Repair and maintenance expenses	11,619,704.97	1,717,274.86
Contract for service fees	36,210,047.37	36,439,117.92
System fees	153,994.40	493,566.61
Other expenses	12,817,168.86	15,652,572.25
Supplied use expenses	16,012,284.56	12,165,130.63
Durable articles expenses	2,676,146.41	5,345,032.26
Facility fees	16,038,491.18	14,416,704.60

Business development fees	614,550.00	653,526.20
Total Operational Expenses	137,732,248.60	125,658,447.76

Remark 23 Project Expenses

(Unit: THB)

	2559	2558
VTO -UAV research and development	-	2,923,000.00
DTI-1 Phase I research and development	4,570,093.46	12,000.00
DTI-1 Phase II research and development	6,532,389.85	-
DTI-1 Phase II (A) research and development	700,011.33	-
DTI-1 Phase II (A) research and development	23,749,923.59	8,884,584.59
DTI-10A research and development	2,440,806.28	12,894,141.19
DTI-1G Phase 1 Guided Missile Test Project	49,803,577.73	579,937,810.54
DTI-1G Phase 2 Guided Missile Test Project	9,045,787.30	-
Academic personnel Development project	3,193,800.00	4,016,968.17
Simulation and Virtuality research and development (D31R)	11,150.00	-
DTI-2 High Performance MLRS research and development	35,026,726.22	17,969,053.95
D9 Test Range research and development	16,839,461.44	16,306,872.10
UAV VTOL research and development	-	4,210,000.00
Armoured Vehicle research and development	128,537,971.40	36,517,050.00
UAV Fixed Wing (D41R) research and development	8,156,363.27	21,483,773.04
Unmanned systems component (D43) research and development	1,002,644.60	319,676.00
Small UAV prototype research and development	3,737,804.50	15,945,397.35
Research and development on missile tests for the static and dynamic sectors 122 mm & 40 km rocket expenses	58,607,773.91	-
Research and development project on a missile test and the static and dynamic sectors 122 mm 10 km rocket	3,341,250.00	-

\Spending on research and development project on 30 mm ammunition to production line (D95)	10,477,673.40	-
The cost of the research and development on unmanned fixed wing-down vertical take-off and landing (FUVEC)	22,370,000.00	-
The cost of research and development on weapon systems & remote control (D66)	200,000.00	-
The cost of research and development on anti-tank rocket system basic research	-	24,000.00
The cost of research and development on virtual shooting range system	2,956,980.00	2,536,140.00
Logistics fees	2,134,080.76	991,757.35
The cost of research and development tests	-	135,000.00
The cost of an explosive charge in the research and development on information systems and centralized application (D22)	4,940,848.10	4,053,081.25
Expenses for research and development projects basic research and training	2,000.00	6,080.00
The cost of research and development projects and basic research	9,392,013.39	4,482,682.25
The cost of research and development & collaboration with various sectors	177,284.80	-
Project component costs	62,830.00	76,755.07
The cost of the research and development on aircraft systems	27,010.00	65,807.00
Raw materials and wireless master pilot plant for renovating the center		
Raw materials and factory supplies used	8,422,179.24	-
Maintenance fees	1,615,453.88	2,467,059.82
Renovation fees	1,899,143.85	3,529,058.20
Total Project Costs	419,975,032.30	739,787,747.87

Remark 24 Depreciation and Distribution Costs

(Unit: THB)

	2559	2558
Depreciation-other infrastructure assets	1,562,295.87	1,512,873.53
Depreciation-Office Building	15,565,467.51	15,537,050.19
Depreciation-Renovating areas	9,900,810.97	13,213,577.54
Depreciation-Office durable articles	1,833,374.98	1,579,395.98
Depreciation-Transportation and Vehicles	2,981,179.08	2,912,690.18
Depreciation-Electronic and radio durable articles	4,268,262.40	3,513,262.32
Depreciation-Commercial and publishing durable articles	55,281.53	41,008.46
Depreciation-Factory supplies	155,250,295.76	146,026,788.81
Depreciation-Construction durable articles	42,055.98	42,055.98
Depreciation-Science related durable articles	6,855,071.53	8,295,093.14
Depreciation-Computer durable articles	9,568,176.07	8,722,783.54
Depreciation-Educational durable articles	737,025.81	426,163.68
Depreciation-Indoor durable articles	45,214.71	49,335.33
Depreciation-Outdoor durable articles	5,307,693.05	1,824,175.61
Depreciation-Sports/Physical durable articles	57,445.23	-
Depreciation-Medical Science durable articles	62.44	-
Depreciation-other durable goods	269,713.94	-
Distribution cost-computer programs	18,461,737.29	7,711,369.65
Distribution cost-Body of knowledge from DTI-1 Phase 1	10,778,037.66	10,778,037.66
Total Depreciation and Distribution Costs	243,539,201.81	222,185,661.60

Remark 25 Provident fund

Defence Technology Institute (Public Organization) or DTI has established a provident fund under the Provident Fund Act BE 2530 by contributing to the fund on a monthly basis at the rate of 3 to 8% of the salaries and length of employment. The provident fund is managed by SCB Asset Management Co., Ltd. (SCB Master Fund)

Remark 26 Commitments

26.1 Commitments by type of expenditure

On September 30, 2016 Defence Technology Institute (Public Organization) or DTI is committed to each of the fiscal expenditure as follows : (Unit : THB)

Fiscal Year	Expenditure Commitments				Total
	Personnel	Progress	Investment	Project Preparation	
2554	-	-	-	5,291,150.00	5,291,150.00
2555	-	-	-	441,108.00	441,108.00
2557	-	-	-	5,053,923.00	5,053,923.00
2558	-	164,067.00	-	203,143,798.00	203,307,865.00
2559	3,719,740.00	16,343,740.00	67,814,634.00	573,592,224.00	661,470,338.00
Total	3,719,740.00	16,507,807.00	67,814,634.00	787,522,203.00	875,564,384.00

26.2 The Research and Development Project to Develop a Database of Geospatial Open Source on the Network Map for the Department of Special Investigation (DSI MAP EXTEND)

Defence Technology Institute (Public Organization) or DTI has entered into an cooperation agreement with the Department of Special Investigation on July 23, 2015 to deliver applications to be used on mobile devices, which are accessible through the Internet map server or DSI MAP, to be completed within a period of one year from the date of signing the memorandum.

The program has been operating for more than 1 year according to the DTI regulations, concerning the management subsidies from the private sector or other organizations, including international organizations and money or property donated in 2015, which was enforced on September 30, 2015. The project operates under the Board of Directors' subsidies on the orders of the Order 9/2559 dated February 19, 2016 and the working group no. 14/2559 dated March 9, 2016.

The progress report of the project's income & expense accounts on September 30, 2016 was as follows :

(Unit : THB)

Income from DSI MAP EXTEND			650,000.00
Project expenses:	The components costs	403,182.00	
	Materials costs	143,315.00	
	Project costs	29,609.80	576,106.80
Higher income than expenses			73,893.20

The project was completed on July 21, 2016 according to the Memorandum of Cooperation between the Defence Technology Institute (Public Organization) and the Department of Special Investigation as stated in the official document no. 5800/707 dated July 21, 2016. The Department of Special Investigation successfully received the system to conduct special investigation to meet the objectives according to the Ministry of Justice letter no. 0806/2831 dated August 11, 2016.

Remark 27 Reclassification

The 2015 comparative figures in the financial statements have been reclassified in comply with the classification and presentation of the 2016 financial statements. The reclassification did not affect the higher (lower) income than the net cost or equity as follows :

(Unit : THB)

	Before the reclassification	Increase (decrease)	After the reclassification
The financial statement			
Inventories	95,169,291.75	(95,169,291.75)	-
Stock	15,197,658.37	95,169,291.75	110,366,950.12
Total	110,366,950.12	-	110,366,950.12
Cash Flow			
Cash flow from operating activities			
Operating assets (increase) decrease:			
Stock	(10,454,182.60)	10,454,182.60	-
Inventories	(4,648,713.40)	(10,454,182.60)	(15,102,896.00)
Total	(15,102,896.00)	-	(15,102,896.00)

Key Events
in 2016

Key Events
in 2016

On the Auspicious Occasion of "The King" and "The Queen"

The National Television Broadcast of DTI Director and Staff Paying Respect to His Majesty the King Rama IX

The program was broadcasted on May 28, 2015 on Channel 11 by National Broadcasting Services of Thailand (NBT).

The program was broadcasted on December 3, 2015 on Channel 5 by Royal Thai Army Radio and Television.

General Sompong Mukdasakul, DTI Director, along with the executives, and officers participated in the national television broadcast of His Majesty the King Rama IX on the auspicious occasion of His Majesty the King's 88th birthday anniversary on December 5, 2015 to show their loyalty and appreciation to His kindness.

Signing a blessing for His Majestythe King Rama IX at Sahathai Samakom Pavilion

General Sompong Mukdaskul, DTI Director, along with the executives, and officers participated in signing a blessing for His Majesty the King Rama IX at Sahathai Samakom Pavilion on March 2, 2016.

The National Television Broadcast of DTI Director and Staff Saluting Her Majesty the Queen

General Sompong Mukdaskul, DTI Director, along with the executives, and officers participated in signing a blessing for Her Majesty the Queen on the auspicious occasion of Her 84th birthday anniversary on August 12, 2016. The program was broadcasted on Channel 5 on August 11, 2016 by Royal Thai Army Radio and Television.

Joint Paying Respect to Her Majesty the Queen

General Sompong Mukdaskul, DTI Director, along with the executives, and officers participated in giving Her Majesty Queen Sirikit the royal honor to show loyalty on the auspicious occasion of the 84th birthday celebration on August 12, 2016 at Phinitprachanat Room at the City Hall, Ministry of Defence.

The Showcase and Demonstration Firing Test of 122 mm Multiple Rocket Launcher

DTI showcased and arranged a demonstration of 122 mm Multiple Rocket Launcher firing test to military officers and student officers attending various courses of the Royal Thai Army as well as teachers and other military staff members on the Firing Power Day of Artillery Center at the Artillery Center, Khao Phu Lone, Lopburi on November 6, 2015.

Delivering the DTI-1G Multiple Launch Rocket System Prototype

DTI hosted the delivery ceremony of DTI-1G the Multiple Launch Rocket System prototype led by General Udomdej Sitabutr, Deputy of Ministry of Defence along with the Defence Minister, DTI delegate ACM Pongsatorn Buasup, Chairman of the Board of Directors and General Teerachai Nakwanich, the Commander-in-Chief of the Royal Thai Army. The prototype was to be delivered to the user's unit, the Field Artillery Division on February 12, 2016 at Field Artillery Division, Pibulsongkram Camp, Lopburi.

Unmanned Aerial Vehicle Systems Demonstration and Seminar

Defence Technology Institute (Public Organization) or DTI arranged the 2nd workshop and demonstration of the results of the research on unmanned aerial vehicle systems on Monday, September 19, 2016 during 09.00-16.30 pm. at D Varee Charnvee Resort, Pakchong, Nakhon Ratchasima. The seminar was conducted to gather knowledge and opinions for the development of a research plan for the unmanned aerial vehicle systems, and the integration of cooperation of unmanned aerospace through related agencies and user units. The ceremony was given an honor of the opening speech by ACM Phongsathon Buasap, DTI Chairman of the Board of Directors.

The 2nd Capacity Showcase of Unmanned Aerial Vehicle Research and Development
The Delivery of Siam UAV the Vertical Take-off and Landing (VTOL) UAV with multi rotors

DTI hosted the delivery ceremony of the Vertical Take-off and Landing (VTOL) Unmanned Aerial Vehicle (UAV) with multi rotors prototype "DTI Siam UAV." The Deputy Prime Minister and Defence Minister, General Prawit Wongsuwon was the delegate of DTI to deliver the prototype to user units such as Royal Thai Armed Forces Headquarters, Royal Thai Army, Provincial Police Region 6 Station, Saraburi Provincial Police, Department of Special Investigation and Department of Corrections for both combat and noncombat mission. The ceremony was held at Bhanurangsi hall, Ministry of Defence on September 23, 2016 and was joined by General Udomdej Sitabutr, Deputy Minister of Defence, and General Sompong Mukdasakul the DTI Director.

Signing to Cooperate with RTA on Research and Development of Armored Vehicle Prototype

DTI led by General Sompong Mukdaskul, DTI Director, signed to cooperate with the Royal Thai Army (RTA). The Army Chief assigned Maj.Gen. Adisorn Korop, Army Research & Development Office Director, as a representative to sign to cooperate in research and development of an armored vehicle prototype along with Maj.Gen. Danai Kritmathawee, Commanding Officer of The Infantry Center as the chairman of the R&D. The goal was to deliver a prototype of an armored vehicle to the Royal Thai Navy for trial by 2017. The signing ceremony was held at Ratchaseniphithak Room, DTI office building, Nonthaburi on May 24, 2015.

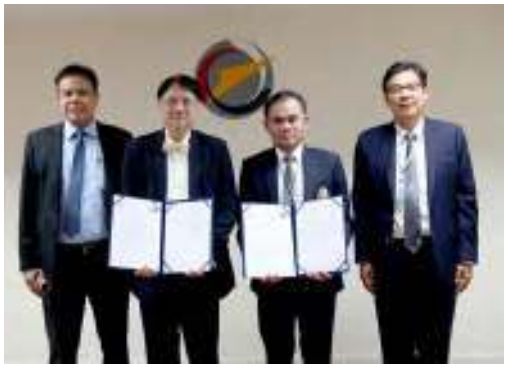
Memorandum of Understanding (MoU) Signing Ceremony on Academic and Research Cooperation

DTI signed a Memorandum of Understanding (MoU) on academic and research cooperation with King Mongkut's University of Technology North Bangkok to develop academic cooperation and research and development of knowledge and personnel in science and defence technology. The signing ceremony took place at King Mongkut's University of Technology North Bangkok on April 7, 2016.

Memorandum of Understanding (MoU) Signing Ceremony on Collaborative Research and Development of EOD Robot Prototype

General Sompong Mukdaskul, DTI Director signed a Memorandum of Understanding (MoU) on research and development cooperation under the "research and development of a prototype of an Explosive Ordnance Disposal (EOD) robot project" with Assoc. Prof. Dr. Avorn Opatpatanakit, CMU Research and Academic Service Department's Vice President on June 10, 2016 to develop robotic technology to meet the needs of the arm forces and can be effectively used in the mission. This project consists of three sub-projects : to develop a small EOD robot isotropic platform, study the possibility of using closed-loop control for visual navigation of robots, and study possibility of detecting an intelligent target using a radar through the ground.

Memorandum of Understanding (MoU) Signing Ceremony on Academic and Research Cooperation between DTI and TINT



DTI arranged a signing ceremony of the Memorandum of Understanding (MoU) on Cooperation in Academic and Research between Defence Technology Institute (Public Organization) and Thailand Institute of Nuclear Technology (Public Organization) to develop cooperation and academic research and development of knowledge and human resources in defence technology at Meeting room 1001, 10th floor of DTI Office Building on Friday, June 24, 2016.

Memorandum of Agreement (MoA) Signing Ceremony with Department of Royal Rainmaking and Agricultural Aviation

DTI led by General Sompong Mukdaskul, DTI Director signed a Memorandum of Agreement (MoA) with the Department of Royal Rainmaking and Agricultural Aviation represented by Mr. Lersak Rewtarkulpaiboon, the Department Director in the development of weather modification rocket system to improve the efficiency of weather modification for water management in rainforests. The ceremony took place at the Miracle Grand Convention Hotel on January 25, 2016.

Memorandum of Cooperation Signing Ceremony to Accredit 30x173 mm and 30x165 Ammunitions for Training

AVM. Jesada Kiriratnikom, DTI Deputy Director signed a Mmorandum of Cooperation on "the accreditation of 30 x 173 mm and 30 x 165 mm ammunitions for training project" with VAdm. Tanin Likitawong, Director of Naval Ordnance Department to carry out the project to support the Royal Thai Navy's mission to be used regularly and also aimed to be standardized and promoted in defence industry. The ceremony took place at Naval Ordnance Department, Sattahip, Chonburi on Jul 28, 2016.

Memorandum of Cooperation Signing Ceremony to Research and Develop in Science and Technology

General Sompong Mukdaskul, DTI Director signed a Memorandum of Cooperation on "the research and development in science and technology with Mr.Wutthikai Watthanawutthikai, President of Kaiser Communications Co., Ltd., to cooperate in research and development in science and technology in order to benefit relevant agencies in the future to support DTI 15-year strategy and to gain knowledge of maintenance and testing at 10th floor, DTI Office Buidling, Nonthaburi on July 29, 2016.

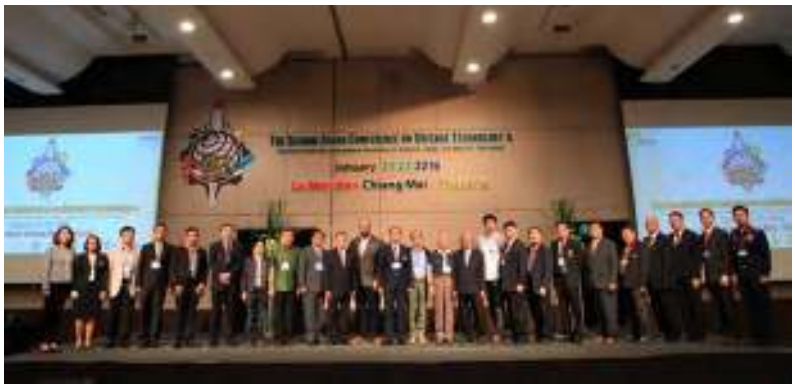
Memorandum of Understanding (MoU) Signing Ceremony for Royal Rain Making Mission

DTI led by General Sompong Mukdaskul, DTI Director signed a Memorandum of Understanding (MoU) to cooperate on the royal rain making mission with the Department of Royal Rainmaking and Agricultural Aviation, represented by Mr. Lersak Rewtarkulpaiboon, the Department Director to jointly carry out the development of weather modification rocket system to improve the efficiency of weather modification for water management and the introduction of unmanned aircraft to support the mission of the Department of Royal Rainmaking and Agricultural Aviation in inaccessible areas. The signing ceremony was held on November 12, 2015 at the Multipurpose Court, Ratthaprasasanabhakti Building, Chalermprakiat Government Complex.

Empowering Networks to Develop Robots for National Security

Defence Technology Institute (Public Organization) or DTI hosted "EOD Robot and Counter Improvised Explosive Devices (C-IED) Technology and Trend workshop" joined by robot technology and anti-explosives experts from several countries: the United States of America, United Kingdom, and Japan to take part in the discussion on the development of anti-explosion and anti-explosion technology linking local research institutes such as the educational institutions, explosives disposal robot unit from the Royal Thai Navy, Royal Thai Air Force and Royal Thai Police on industrial production. The conference was attended by industry representatives to drive the development of robots for stability to be actually produced and used with ACM Pongsatorn Buasup presided over the opening ceremony on September 6, 2016 at the Dusit Thani Hotel, Phetchaburi.

The Second Asian Conference on Defence Technology & The First Pacific Rim International Workshop (ACDT2016)



Defence Technology Association led by DTI, together with research and educational institutions organized the Second Asian Conference on Defence Technology & the First Pacific Rim International Workshop (ACDT2016). The conference was attended by scholars from many countries to present academic papers and lecture/seminar with ACM Pongsatorn Buasup, DTI Chairman of the Board of Directors, scholars and experts from Defence Technology Research Institutes from ASEAN leading countries providing a forum for presenting research and knowledge exchange in the field of defence technology academic research at the international level on January 21-23, 2016 at the Le Meridien Chiang Mai Hotel, Chiang Mai.

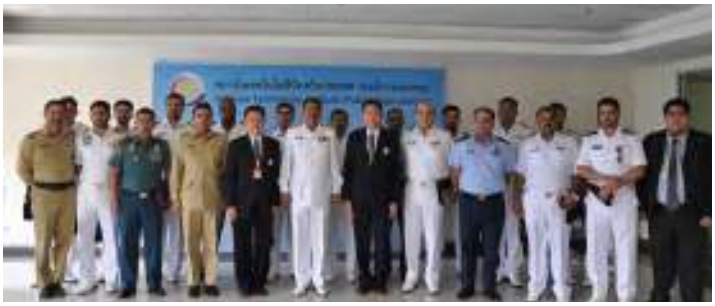
EOD Robot Technology Workshop to Fulfill Security Missions

DTI has hosted seminars and exhibitions by inviting authorities related to the Explosive Ordnance Disposal (EOD) of the Armed forces, Royal Thai Police, educational institutions and the private sector to brainstorm ideas for cooperation and goal setting to develop an EOD robot to support and return peace and security back in the lives of the people in the three southern border provinces as well as to promote self-reliance for the defence industry on May 24, 2016 at Siampathaphiphithak room, 10th Floor, DTI Office Building.

Defence Permanent Secretary, General Preecha Chan-ocha paid a visit to DTI Research and Development Workshop

General Preecha Chan-ocha, Defence Permanent Secretary and group paid a visit to DTI Research and Development Workshop 1 in Nakhon Sawan province and listened to information briefing about the mission and operational management of the DTI Research and Development Workshop from General Sompong Mukdasakul, the DTI Director on November 18, 2015.

Welcoming Pakistan Naval War College



In relation to international collaboration, DTI was informed by the Embassy of Pakistan to receive the professors and student officers from Pakistan Naval War College class of 45 led by Commodore Ali Abbas to pay a study visit to DTI. AVM Jessada Kiriratnikom, DTI Deputy Director, gave a warm welcome to the delegates while WGCDR Anant Chotchuangnapa, DTI Defence Technology Analyst narrated the information briefing on March 2, 2016 at Siam Patapeepitak Meeting Room, the 10th floor, DTI Office Building.

Welcoming the Delegates of India's Minister of Defence

General Sompong Mukdasakul, the DTI Director, assigned AVM Jessada Kiriratnikom as DTI delegate in welcoming the delegates of India's Minister of Defence while WGCDR Anant Chotch-uangnapa gave the information briefing at DTI Siam Patapeepitak Meeting Room, the 10th floor on February 3, 2016.

Welcoming Japanese Defence Minister to DTI





DTI welcomed Japanese Defence Minister on a visit to DTI on the occasion of the official visit aiming to acquire the knowledge on a research and development institute of Thailand's Ministry of Defence on June 7, 2016. ACM Pongsatorn Buasup, DTI Chairman of the Board of Directors, and General Sompong Mukdasakul, the DTI Director, and the group of DTI Board of Directors joined to give a welcome. The purpose of the visit was to seek cooperation guidelines about research and development in the future that could be developed into a strong and mutually beneficial cooperation at bilateral levels in terms of economy, concerning a reduction of cost of conducting a research, risk diversification, an extension of research networks to commercial manufacturing, or serving military mission, regarding sharing military weapons and equipments. In terms of international relationships, it could allow government authorities, the private sector, and academic institutes to arrange co-research and development, leading to creation of innovations for strengthening national security in the future.

Site Visits

Representatives from Office of the Public Sector Development Commission paid a visit to DTI to inspect documents used to evaluate operational performance according to the Public Affairs Management Plan for the 2015 fiscal year of DTI (Site Visit) as well as to observe DTI chemical laboratory.




Welcoming Student Officers of National Defense College of the Philippines

AVM Jessada Kiriratnikom, DTI Deputy Director welcomed the group of 22 student officers from National Defense College of the Philippines led by COL Stephen Agototo Prof (MNSA), Military Assistant to Executive Vice President, National Defense College of the Philippines. LTCOL Supoj Kraisakdawat, DTI Defence Technology Analyst gave the information briefing at DTI Siam Patapeepitak Meeting Room, the 10th floor, DTI Office Building on May 23, 2016.

Welcoming the Student Officers from The National Defence College of Bangladesh

AVM Jessada Kiriratnikom, DTI Deputy Director welcomed LTGEN Chowdhury Hasan Sarwardy Bir Bikram, SBP, ndc ,psc, Commanding Officer of the National Defence College of Bangladesh and led a discussion about cooperation between the National Defence College of Bangladesh and DTI at DTI Meeting Room, the 10th floor, DTI Office Building on September 28, 2016.

DTI Hold Special Lecture at Royal Thai Army War College






DTI held a special lecture about DTI missions, operational management as well as research and development to share knowledge about defence technology to student officers of Royal Thai Army War College. The special lecture was delivered by Colonel Wutigrai Pibumrung, Director of Policy and Plan Department, at Royal Thai Army War College on November 25, 2016.

DTI Hold Special Lecture at Joint Staff College

DTI arranged a special lecture about missions, operational management as well as research and development to share knowledge about defence technology to student officers of Joint Staff College. The special lecture was delivered by Colonel Wutigrai Pibumrung, Director of Policy and Plan Department at Joint Staff College on December 4, 2015.



Special Lecture at RTA Logistics School

LTCOL Supoj Kraisakdawat, DTI Defence Technology Analyst delivered a lecture on defence technology and Acting 2LT Lamyong Santawee, Ph.D., DTI Executive Director of Academic Cooperation Division, gave an introduction about the Master's Degree in defence technology engineering course, academic scholarships, supporting scholarships for research projects and theses. The exhibition of DTI research and development tasks took place at the RTA Logistics School on March 16, 2016.

Special Lecture for Student Officers at Air Command and Staff College

DTI hosted a special lecture on "defence technology" for students in the course of air command and staff class of the 60th. The lecture was delivered by WGCDR Anant Chotchuangnapa, Director of Defence Technology Analysis Department, at the lecture room, Air Command and Staff College, Royal Thai Air Force, on August 16, 2016.

Special Lecture at Naval War College, Royal Thai Navy

DTI hosted a special lecture about " knowledge involving defence technology" for military officers at Naval War College, Royal Thai Navy by CAPT Nanat Tantadsakul, DTI Research and Development Team. The exhibition showing a demonstration of simulation of the movement pattern as well as DTI research and development tasks took place at a classroom of Naval War College, Royal Thai Navy, on December 1, 2015.

Special Lecturer for Student Officers at Senior Air Officer College

DTI hosted a special lecture on the topic "defence technology" for student officers in the senior command and staff course of the academic xrector of Defence Technology Analysis Deparment at a lecture room, Senior Air Officer College on August 24, 2016.

Special Lecture for Student Officers of Naval Command and Staff College, Royal Thai Navy






DTI hosted a special lecture on the topic "Technology and War In the Future" for student officers from the two courses of Naval Command and Staff College: Thai language curriculum lectured by CDR Chatchawal Haemkiartkul, DTI Defence Technology Analyst, and for English language curriculum lectured by LTCOL Supoj Kraisakdawat, DTI Defence Technology Analyst. The exhibition providing interesting information, DTI research and development tasks, demonstration of unmanned aerial vehicle (UAV) systems took place with a trial test of UAV system offered on February 25, 2016 at Naval Command and Staff College, Naval Education Department.

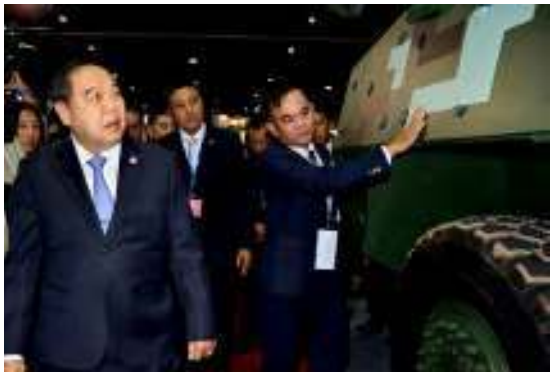
DTI Lead " Defence Technology for National Security" Discussion





Defence Technology Institute (Public Organization) led by General Sompong Mukdasakul, DTI Director along with ACM Surasak Meemanee, DTI consultant, participated in a model planning scheme of research and development of Unmanned Aerial Vehicle (UAV) system technology at Thailand National Defence College in the discussion for knowledge exchange in the course of national defence (NDC) for the class of the 59th, academic year 2016-2017 on the topic of "Defence Technology for National Security" on January 25, 2017 for student officers of the National Defence College. The purpose was to increase understanding about a critical role of science and technology development for national defence and a guideline of organization and personnel in science and technology development as well as to raise awareness of the situations and propose how to address problems appropriately to build a powerful nation with security in accordance with the current situation.

Exhibitions Showing Research and Development Tasks and Demonstration of Defence Technology



DTI organized an exhibition showing research and development tasks and demonstration of defence technology on the occasion that Ministry of Defence held the event called Defense & Security 2015. Military weapons and equipment as well as technology served in military missions were presented in the exhibition in order to publicize and transfer technology from research and development in different projects. General Prawit Wongsuwon, Deputy Prime Minister and Minister of Defence received the honor to commence the exhibition. General Preecha Chan-ocha, Permanent Secretary of the Ministry of Defence, and Commander-in-Chief of all armed forces visited the exhibition. ACM Pongsatorn Buasup, Chairman of the DTI Board of Directors and General Sompong Mukdasakul, DTI Director were present to give a warm welcome. The exhibition was full of activities shown on display boards and DTI research and development tasks at Hall 6-8, IMPACT Exhibition Center Muang Thong Thani on November 2, 2015.

Organizing Exhibition about Military Innovation

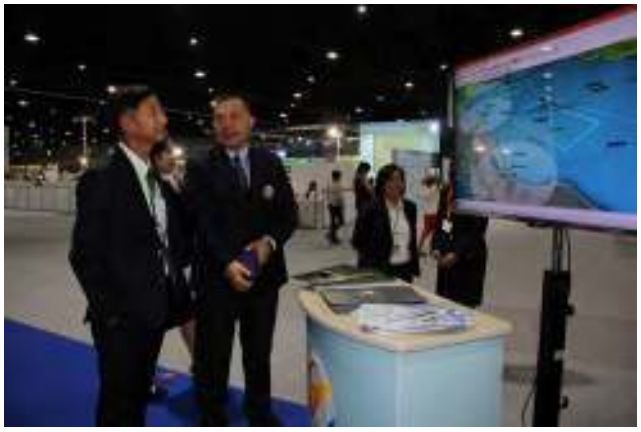
DTI organized an exhibition showing research and development tasks. General Sommai Kaotira, the Commander of the Royal Thai Armed Forces Headquarters acted as a leader in paying a visit a strategy training in the Combined Arms Live Fire Exercise practice. Delegates of Commander in Chielf of Royal Thai Army, Royal Thai Navy, Royal Thai Air Force, and Civil service joined the group in paying a visit. Colonel Chatpong Phanpayak, Acting Director Business Development Department and Director Project Development and Cooperation, gave a warm welcome to the group at the 2nd Army Area Tactical Training Center, Wang Nam Khiao district, Nakhon Ratchasima province on July 6, 2016.

DTI Join 2016 Naval Research Exhibition

DTI joined the exhibition "Naval Research 2016." Admiral Na Areenich, Commander in Chief of Royal Thai Navy presided over the exhibition and paid a visit to booths showing research and development tasks organized by DTI. General Sompong Mukdasakul, DTI Director, gave a warm welcome. On this occasion, DTI publicized missions and progressive contribution of research and development to a number of military officers, teachers and students coming from various academic institutes of more than 500 people while among them are high-ranking officers who paid a visit to DTI exhibition booths at the Navy Hall, Navy Auditorium and Conference Center on August 18, 2016.

DTI Join " National Science and Technology Fair 2016"

DTI joined the "National Science and Technology Fair 2016" to publicly share mission and progressive contribution of research and development to people, teachers, students from different academic institutes. Interest and Attention were made by high-level officers who paid a visit to exhibition booths in Hall 2-8 at IMPACT Exhibition Center Muang Thong Thani during August 18-28, 2016.



DTI Join "Promote Academic Works to Mass Production" Seminar

Colonel Assistant Professor Taweewat Weerakraew (Ph.D), DTI Deputy Director as a delegate from DTI, joined the Army Research Day 2016. Parades of vehicles from Royal Thai Army, exhibitions of research and inventions from internal and external Royal Thai Army units were presented. Colonel Assistant Professor Taweewat Weerakraew (Ph.D) joined the talk in the morning session on the topic of "Promote Academic Works to Mass Production," which gained considerable interest by a large number of audience at Royal Thai Army Club, Vibhavadi on Wednesday August 24, 2016.

Donation to Thai Kindness Fund led by DTI Director and Staff

General Sompong Mukdaskul, DTI Director along with the officers donated 11,600 baht to Thai Kindness Fund for those in service in the three Southern border provinces and the areas of responsibility of the Royal Thai Navy at Wangderm, the Royal Thai Navy Headquarters on January 5, 2016.

DTI Hosted Communication Rocket Invention Camp 2016

DTI hosted the Communication Rocket Invention Camp 2016 by developing the ability to use invented rockets in a new dimension for 90 vocational college students and 30 advisors from 18 colleges selected from the Office of the Vocational Education Commission and the Military Academy to promote the development of knowledge about rocket technology and communication systems, to create a good attitude toward studying science and technology for the advancement of social innovation, and to create a person interested in science to be a future researcher. The activity was divided into 3 periods:

Period 1 : Training activity for 4 days and 3 nights on February 9-12, 2016 at the Patumthani Vocational College

Period 2 : Meeting with the advisory board divided into the rocket system and electronic communications system on March-April, 2016 at the Defence Technology Institute.

Period 3 : Presenting detail design report, innovative missile test firing, decision making on the winning team, and the awarding ceremony at Phu Lon mount shooting range, Royal Thai Artillery Center, Lopburi on May 11-12, 2016.

DTI Granting 4 Scholarships to Selected Military Officers

DTI offered 4 scholarships to study Master's degree in Defence Engineering at King Mongkut's Institute of Technology Ladkrabang to selected military officers in 2016 (300,000 baht each; in total of 1,200,000 baht). It is a joint project between DTI and KMITL with the objective to produce and promote the development of knowledge in defence technology for selected military officers to apply the knowledge to the military and defence technology. The ceremony took place at 10th floor meeting room of DTI, DTI Office Building on August 16, 2016.

DTI Granted Scholarships to the Children of the Officers under the Jurisdiction Office of the Office of the Permanent Secretary for Defence

General Sompong Mukdasakul, Director of Defence Technology Institute (Public Organization) granted scholarship to the children of the officers under the Jurisdiction Office of the Office of the Permanent Secretary for Defence. The scholarship ceremony, led by General Preecha Chan-ocha, the Permanent Secretary for Defence, was held to promote and support the educational opportunities for the children of the officers in service. DTI have offered 30 scholarships, which were divided into 5 scholarships for the Secretary Department, 5 for the Office of Policy and Planning, Ministry of Defence, 5 for the Office of the Defence Budget, 5 for the Weapon Production Center, Defence Industry and Energy Center, and 5 for the Military Explosives Factory, Department of Military Industry, Defence Industry and Energy Centre with the total amount of 150,000 baht. The ceremony was held on September 23, 2016 at Sanam Chai room, City Hall, Ministry of Defence.

Profile of the Board of Directors
in 2016

Air Chief Marshal Pongsatorn Buasup

Chairman of the Board of Directors

Education

- Armed Forces Academies Preparatory School (Batch 10)
- Bachelor of Science, Aerospace Engineering, Royal Thai Air Force Academy (Batch 17)
- AVIONICS OFFICER
- AIRCRAFT MANEUVERING INSTRUMENTATION SYSTEM
- Air Command and Staff College
- Air War College National Defense College (Batch 48)

Work Experiences

- 2011 Senior Advisor, Office of Permanent Secretary for Defence
- 2008 Deputy Chief of Staff officers to the Minister of Defence Office
- 2006 Deputy Director-General of Research and Development Centre for Space and Aeronautical Science and Technology
- 2004 Director-General of Directorate of Armament
- 2002-2004 Deputy Director General of Directorate of Armament
- 1997 Chief of Staff, Directorate of Armament
- 1993 Director of Logistic, Directorate of Armament
- 1988 Operations and Intelligence Staff Officer, Directorate of Armament
- 1987 Scientist, Scientific Division, Directorate of Armament
- 1987 Chief of Armament Section, Maintenance Division, Wing 1
- 1981 Squad Leader of Armament, Air Squadron 102, Wing 1
- 1975 Assistant Squad Leader of Grenade, Directorate of Armament

Experience and related tasks

- Board of Committee of the Transport Co. Ltd.
- Board of Committee of Aeronautical radio of Thailand Ltd.
- Advisor of Board of Committee of Metal and Materials Technology Center
- Research PaperoftheAir CommandandSta College as a Guideline of F-16A/B Armament System Development and Procurement of the Royal Thai Air Force
- Formulating Maintenance System of F-1 A B, Wing 1
- Supervise L-39 Armament Standardcertion certification of the Royal Thai Air Force to ELBIT officers
- Head of PYTHON-3 Installation and Test Team-F-16A/B
- Headof Working Group of MK-20 installation Standard certification process (ROCKEYEX-F-5E/F)
- The Executive of Maintenance, COPE THUNDER 82-3 training, the Philippines
- Air Force Innovative Award (AIM-9 CAPTIVE and ACMI POD-ALPHAJET)
- Air Force Innovative Award (Pylon Inspection-F-5E/F)
- Air Force Innovative Award (Armament Inspection-F-5E/F)

Observation

- AVIONICS OFFICER Course
- WEAPON SYSTEM MECH. (F-105D) Course
- WEAPON SYSTEM MECH. (F-5E) Course
- WEAPON SYSTEM MECH. (F-16A/B) Course
- PRECISION GUIDED WEAPON (LGB) Course
- AIRCRAFT MANEUVERING INSTRUMENTATION SYSTEM Course

General Preecha Chan-ocha

Permanent Secretary for Defence / Member of the Board of Directors

Education

- Finished Senior High School (Mattayomsuksa 4) from Wat Nuannoradit School, Bangkok.
- Armed Forces Academies Preparatory School (Class15).
- Chulachomklao Royal Military Academy (Class 26).
- Army Aviation School (Class 20).
- Command and General Staff officer Course, Command and General Staff College (Class 67).
- Diploma, National Defence College of Thailand, year 2009.
- Master Degree: Master of Public Administration (Public Policy), Naresuan University, Phitsanulok province.

Work Experiences

- Chief of Staff, the 3rd Armed Force Deve. Battalion in year 2002.
- Director-General Civil Affairs Division, The 3rd Army Area in year 2003.
- Deputy Commander the 3rd Armed Force Deve. Battalion in year 2007.
- Chief of Staff the 3rd Corps in year 2008.
- The 3rd Army Area Deputy Commander in year 2010
- The 3rd Corps Commander in year 2012.
- The 3rd Army Area Commander on 3 May 2013.
- Assistant Commander-in-Chief of Royal Thai Army in year 2014
- Permanent Secretary for Defence in year 2015.

Experience and related tasks

- Being on active service as a pilot.
- Being on border service and participating in suppression the communist terrorism during year 1981-1988.
- Being on active service for civil affairs in 17 provinces, the North of Thailand.
- Being on active service for Royal initiative projects of King Bhumibol in the area of the 3rd Army area, totally 43 projects.
- Being on active service to help and support people suffering from disasters.
- Being on active service as Commander of Special Task Force in Yala province to ensure security and peacefulness in the southern border provinces of Thailand.
- Being on active in the position of Permanent Secretary for Defence in year 2015.

Observation

- United States of America, Russia, Italy, France, Switzerland, Belarus, Korea, Japan, Taiwan, People's Republic of China, Brunei, Myanmar, Lao People's Democratic Republic, Vietnam, England, Singapore and Malaysia.

General Surapong Suwana-Adth

Chief of Staff / Member of the Board of Directors

Education

- Armed Forces Academies Preparatory School (Class 15).
- Bachelor's degree of Science, Virginia Military Institute, United States of America.
- Master's degree in Physic, the University of Virginia.
- Command and General Staff Officer Course (Class 68), Command and General Staff College.
- Command and General Staff Officer Course, United States Army Command and General Staff College.
- Master of Military Arts and Sciences degree, United States Army Command and General Staff College.
- Diploma, National Defence College, The Joint State-Private Sector Course, (Class 21).

Work Experiences

- Army Attache at Washington, D.C., United States of America.
- Director of Directorate of Joint Intelligence.
- Director of Joint Operations.
- Chief of executive staff committee attached to the Chief of Defence Forces.
- Deputy Chief of Staff.

Experience and related tasks

-

Observation

-

General Pisit Sitthisarn

Deputy Commander in Chief, Royal Thai Army / Member of the Board of Directors

Educational background before joining in the government service

- Rittiyawannalai School
- Armed Forces Academies Preparatory School (Class 17)
- Chulachomklao Royal Military Academy (Class 28)

Educational background after joining in the government service

- Infantry Officer Basic Course (class 66)
- Infantry Officer Advance Course (class 48)
- National Defense Regular course Command and General Staff College (class 67)
- Master's degree in Business Administration, Kasetsart University 2009
- Diploma, National Defence College of Thailand, class 53

Work Experiences

- 1996 The 2nd Infantry Battalion Commander, the 11th Infantry Regiment King's Guard.
- 2005 The 11th Infantry Regiment King's Guard Commander.
- 2007 The Deputy Commander the 1st Division, King's Guard.
- 2011 Commanding General the 2nd Infantry Division, Queen's Guard.
- 2011 Commander the 1st Division, King's Guard.
- 2012 Deputy Commanding General, 1st Army Area.
- 2014 1st Corps Commander.
- 2014 Deputy Chief of Staff, Royal Thai Army.
- 2015 Chief of Staff, Royal Thai Army.
- 2016 Deputy Commander in Chief, Royal Thai Army.

Experience and related tasks

- 2005 Commander, Special Task Force, the 11th Infantry Regiment King's Guard.
- 2012 Commander, Special Task Force, Narathiwat province.
- 2014 was appointed as a member of National Legislative Assembly.
- 2015 Secretary-General, Internal Security Operations Command.

Admiral Pallop Tamisanon

Chief of Staff, Royal Thai Navy / Member of the Board of Directors

Educational

- Junior High School-Mattayomsuksa 1-3: Suankularb Wittayalai School.
- Armed Forces Academies Preparatory School (Class 15).
- Naval Cadet (Class 72).
- The Naval Academy
- Murwik, The Federal Republic of Germany.
- Diploma, Naval Staff School (Class 50).
- Diploma, Naval War College (Class 33).
- Diploma, Surface Warfare Officers School-United States of America.
- Diploma, Naval War College -United States of America.
- Diploma, National Defence College, The State, Private Sector and Political Sectors (Class 5).
- Bachelor's Degree in Political Science, Major-International Relations and Comparative Governments and Politics, Sukhothai Thammathirat Open University.
- Master's Degree in Political Science, Thammasat University.

Work Experiences

- 1988-1989 Commanding Officer (Captain) of Royal Navy Warship HTMS Udomdej
- 1990-1991 Commanding Officer (Captain) of Royal Navy Warship HTMS Ratankosin
- 1994 Deputy Director-General Policy and Planning Division, Naval Logistics Department.
- 1996-1997 Director-General Education Division, Naval Staff College
- 1998-2000 Director-General Policy and Planning Division, Naval Operations Department
- 2002 Command and General Staff Officer, Chief of Staff, Royal Thai Navy.
- 2003-2004 Deputy General Naval Operations Department.
- 2005-2007 Naval Attache in Singapore.
- 2008-2009 Director- General Naval Communications Department.
- 2009-2012 Director General Naval Operations Department.
- 2012-2013 Assistant Chief of Staff for Intelligence.
- 2013-2014 Deputy Chief of Staff, Royal Thai Navy.
- 2014-2015 - Senior Expert, Royal Thai Navy
  - Chief of the Office of the Secretary General to the Command Center for Combating Illegal Fishing (CCCIF)
- 2015-Oct. 2016 - Chief of Staff, Royal Thai Navy.
  - Director General Thailand-Maritime Enforcement Coordinating Center.
  - Chief of Staff to CCCIF.
  - Chief of the Office of the Secretary General to CCCIF.
- 2015- Present - Member of the National Legislative Assembly

Observation

- Training and study trip of Harpoon guided missile system in United States of America.
- Training and study trip of Aspide, Albatros missile launching system and an effective countermeasure system-Dagaie system in European Union.
- Training and study trip of C-801 anti-ship missile in the People's Republic of China.
- Training and study trip of the OTO Melara 76mm Super Rapido Naval Gun-system and Bofors 40mm L/70 gun system in Italy.
- Training and study trip of 100mm.and 37mm. anti-aircraft gun systems in the People's Republic of China.

Air Chief Marshal Jom Rungsawang

Chief of Staff, Royal Thai Air Force / Member of the Board of Directors

Educational

- Armed Forces Academies Preparatory School (Class 16).
- Royal Thai Air Force Academy (Class 23).
- National Defense Academy of Japan (Class 26).
- Squadron Officer School (Thailand), Class 64.
- Air Command and Staff College, (Class 36).
- Air Command and Staff College (Japan) in year 1993.
- National Defense Academy of Japan (Air Self-Defense Force) in year 1998.
- National Defence College of Thailand, (Class 54).

Work Experiences

- Pilot officer, 3rd Air operations Division, Squadron 102, Wing 1 on 15 February 1988.
- Commander, 4th Air operations Division, Squadron 102, Wing 1 on 1 October 1989.
- Air staff officer, Air area tactical training center, Directorate of Operations on 1 October 2001.
- Deputy Director-General , Directorate of Intelligence on 1 October 2006.
- Commander-Air command and staff College, Directorate of Education and Training on 1 October 2008.
- Director-General, Directorate of Operations on 1 October 2009.
- Assistant Chief of the Air Staff, Operations division, Royal Thai Air Force Headquarters on 1 October 2012.
- Deputy Chief of the Air Staff, Royal Thai Air Force Headquarters on 1 October 2013.
- Chief of the Air Staff, Royal Thai Air Force Headquarters on 1 October 2014.

Experience and related tasks

- Pilot of 2- 4 fighter jet aircrafts (Bor Kor 18 khor/kor) squadron 102 on 1October 1987.
- A member of National Legislative Assembly on 31 July 2014.
- A member of the National Council for Peace and Order on 1 October 2016.
- A member of National Legislative Assembly.
- A member of Council of Defence.
- An executive committee of Defence Technology Institute (Public Organization).
- An executive committee of Airports of Thailand Public Company Limited.
- An executive committee of Thai Aviation Industries Co., Ltd.
- Judiciary, Military supreme court.
- An executive committee of National Anti-Corruption Commission.
- An executive committee on Preparations for National Reform and Reconciliation.

Lieutenant General Egkachai Vacharaprateep

Expert Member of the Board (Defence Technology and Industry)

Educational

- Armed Forces Academies Preparatory School (Batch 10)
- Chulachomklao Royal Military Academy (Batch 25)
- Command and General Staff College (Batch 62)
- Master of Arts (Public Administration), Burapha University

Work Experiences

- Chief of Ordnance
- Deputy Chief of Ordnance
- Director-General of Military Vehicle Maintenance, Department of Ordnance
- Director of Logistics Division, Department of Ordnance
- Director of Engineering plan Division, Department of Ordnance
- Director of Comptroller Division, Department of Ordnance
- Director of Ordnance Depot, Ordnance Industrial Center, Department of Ordnance
- Director of Ordnance Development, Ordnance Industrial Center, Department of Ordnance
- Director of Vehicle Factory, Military Equipment and Ordnance Maintenance Division, Ordnance Industrial Center
- Department of Ordnance

Mr. Boonyarak Duangrat

Expert Member of the Boards
(Human Resource and Management)

Education

- Armed Forces Academies Preparatory School (Batch 15)
- Bachelor of Business Administration, Assumption University
- Master of Business Administration, Kasetsart University

Work Experience

- 1999-Present Human Resource Management Department Fontiera Brand Company (Thailand)
- 1997-1998 General Manager, KPN Company Limited
- 1996-1997 General Manager, Plus Property Management Company Limited
- 1993-1996 Vice Managing Director, Sansiri Public Company Limited
- 1991-1993 Manager of Human Resource Department, Siripinyo Company Limited
- 1985-1990 Head of Procurement Division, National Petrochemical Company Limited

Observation

- Job Assessment Course, Hay Consultant, Malaysia
- Leadership (Basic Course), Hay Consultant, Singapore
- Leadership (Advance Course), Hay Consultant, Singapore
- Modern Manager Program (MMP), Chulalongkorn University
- Purchasing & Supplies, ICI Company, UK

Miss Krithpaka Boonfuneg, (Ph.D.)

Expert Member of the Boards (Legal)

Education

- Bachelor of Laws, Thammasat University
- Master of Laws, Chulalongkorn University, U.S.
- Master of Laws (LL.M.), American University, U.S.
- Master of Laws (LL.M.), University of Pennsylvania, U.S.
- Doctor of Juridical Science (S.J.D.), American University, U.S.

Work Experience

- 2003 Intellectual Property Rights Academic, National Science and Technology Development Agency
- 2006 Intellectual Property Rights Expert, Technology Licensing Office
- 2008 Intellectual Property Rights Advisor, CTECH, SCG
- 2009 Intellectual Property Rights Expert, Alliance Development Office
- 2011 Manager, Marketing Strategy, National Science and Technology Development Agency
- 2014 Senior Advisor, Government Cooperation Department, National Science and Technology Development Agency.
- 2015 Director of Intellectual Property Rights and Biodiversity Resource, Biodiversity- Based Economy Development Office (Public Organization)

Experience and related tasks

- 2004 Draft Committee of Criteria of Rights of Publication and Commercial of E-Information of Office of the Royal Society
- Working Group of study of Measures and Methods of Intellectual Property Registering, Science and Technology Ministerial Decree (4/2005)
- Working Group of Objections to Patents of Kwau Krua abroad, Department of Thai Traditional Medicine
- Project Management Committee of Technology Economy Development, Science and technologyministerial Decree (86/2005)
- 2006-2007 Advisor of Intellectual Property Right, King Mongkut's University of Technology North Bangkok Business Incubator
- 2008-2013 Associate Judge, Central intellectual Property And International Trade Court
- 2006-Present Special Lecturer on Intellectual Property Rights and Intellectual Property Management and Innovation, Biodiversity Management at Ramkhamhaeng University, Bangkok University, Mae Fah Luang University, College of Innovation, Thammasat University, King Mongkut's University of Technology Thonburi
- 2008-2009 Advisor of Intellectual Property Right, Walailak University Business Incubator
- 2012-2014 Advisor to the Board of Directors of East Water Group
- 2012-2014 Chairman of the Board of Directors of Universal utilities Company Limited
- พ.ศ. 2012-Present Steering Committee of Institute of Intellectual Property and Business, Thammasat University

Observation

- Management of Intellectual Properties in Biotechnology and Life Sciences, Mahidol University and BioLaunch Deutschland
- Patent Agent Course (DIP)
- The Program on Technology Licensing for ASEAN Countries (AOTS) Tokyo, Japan
- Workshop on Conversion of Intellectual Property into Assets
- Conference on Dispute Resolution in International Science and Technology Collaboration, organized by World Intellectual Property Organization (WIPO), Geneva, Switzerland
- Institutional and Capacity Development in The Targeted Fields of Science and Technology: Establishment of Technology Licensing Office (JICA) Tokyo, Japan
- IOD: DCP 173/2013, RNG 5/2013

Mrs. Puntip Surathin

Expert Member of the Boards (Accounting, Finance and Budget)

Education

- High School, Rajini School
- Bachelor of Accountancy (2nd Honour), Chulalongkorn University (1967)
- Master of Business Administration, Fort hays Kansas State College, U.S.A

Work Experience

- 2007 Director General of the Treasury Department
- 2005 Deputy Permanent Secretary, Ministry of Finance
- 2002 Director General of State Enterprises Policy Office
- 2000 Inspector General of Ministry of Finance
- 1998 Senior Advisor of State Enterprise Evaluation and Privatization
- 1998 Spokesperson of Ministry of Finance
- 1995 Deputy Director-General of the Comptroller General's Department

Experience and related tasks

- Board of Committee of PTT Plc.
- Board of Committee of Thai Military Bank Plc.
- Board of Committee of Siam Commercial Bank Plc.
- Board of Committee of Thanachart Capital Plc.
- Board of Committee ofKasikorn Bank Plc.

Observation

- Capital Market Academy (Batch 3)
- Sasin-Kellogg Senior Administrators Program (SAP) Module
- Directors Certification Program (DCP), IOD (Batch 5)
- National Defense College (Joint Public Private sector Course) (Batch40)

General Sompong Mukdaskul

General-Director of Defence Technology Institute

Education

- Armed Forces Academies Preparatory School (Batch 15)
- Chulachomklao Royal Military Academy (Batch 26)
- Field Artillery Officer Advanced Course, Oklahoma, the United States of America
- Communication and Electronic Staff Officer Course, Oklahoma, the United States of America
- Command and General Staff College (Batch 66)
- Chief of Staff Course, Military Staff College
- National Defence College, National Defence Studies Institute (Batch 21)
- National Defense Course Institute of Defense
- Master of Arts (Public Administration), Burapha University

Work Experience

- 2007-2008 Head of Defence Industry Office, Defence Industry Department, Defence Industry and Energy Center
- 2008-2009 Director of Military Explosives Factory, Defence Industry Department, Defence Industry and Energy Center
- 2009-2011 Deputy Director of Defence Industry Department, Defence Industry and Energy Center
- 2011-2012 Senior Advisor, Office of the Permanent Secretary of Defense
- 2012-2013 Deputy Director-General, Defense Technology Institute (Public Organization), Ministry of Defence
- October 2013-Present Director-General, Defense Technology Institute (Public Organization), Ministry of Defence

The Board of Directors meetings attendance

of the 2016 fiscal year

	Position	Name list of the Board of Directors	10.58 27 Oct 15	11.58 24 Nov 15	12.58 22 Dec 15	1.59 22 Jan 16
1	Chairman of the Board	Air Chief Marshal Pongsatorn Buasup	1	1	1	1
2	Permanent Secretary	General Preecha Chan-ocha	1	1	1	1
		Representative / General Thitinan Thanyasiri		•	•	•
		Representative / General Bovornrat Kajornneatiyud				
		Representative / Lieutenant General อภิชาติ วิไลเนตร				
3	Chief of Joint Staff	General Surapong Suwana-Adth	1	1	1	1
		Representative / พลเอก พัฒนพงศ์ องอาจทธิชัย	•			
		Representative / Major General Tanongsak Rongtim			•	•
4	Chief of Joint Staff, Royal Thai Armed Forces	General Pisit Sitthisarn	1	1 •	1 •	1 •
		Representative / Colonel Somchai Onsomkit				
5	Chief of Staff, Royal Thai Army	Admiral Pallop Tamisanon	1	1	1	1 •
		Representative / พลเรือโท สุชีพ หวังไมตรี				
		Representative / พลเรือตรี บุญเรือง หอมขจร				
		Representative / นาวาเอก ยอดยุทธ วงษ์วานิช				
6	Chief of Staff, Royal Thai Air Force	Air Chief Marshal Jom Rungsawang	1 •	1 •	1 •	1
		Representative / นาวาอากาศเอก นิทัศน์ ยูประพัฒน์				•
		Representative / นาวาอากาศเอก ปิยะกิตติ์ สุทธิวัฒน์ธนากูล				
7	Expert Member of the Board	Lieutenant General Egkachai Vacharaprateep	1	1	1	1
8	Expert Member of the Board	Mrs. Puntip Surathin	1	1	1	0
9	Expert Member of the Board	Mr. Boonyarak Duangrat	1	0	1	1
10	Expert Member of the Board	Miss Krithpaka Boonfuneg, (Ph.D.)	1	1	1	1
11	Secretary and Member of the Board	General Sompong Mukdaskul	1	1	1	1
12	Advisor	พลอากาศเอก ยุทธพร ภู่ไพบูลย์	1	1	1	1
13	Advisor	พลเอก ประยุทธ เมฆวิชัย	0	1	1	1
14	Advisor	ดร.ปริทรรศน์ พันธุบรรยงก์	1	0	1	0
15	Advisor	ศ.ดร.สุรชาติ บำรุงสุข	0	1	1	0
		รวมคณะกรรมการจริงที่เข้าประชุม	**13**	**13**	**15**	**12**

2.59 23 Feb 16	3.59 22 Mar 16	4.59 31 Mar 16	5.59 26 April 16	6.59 24 May 16	7.59 24 Jun 16	8.59 26 Jul 16	9.59 23 Aug 16	10.59 27 Sep 16	Total	Percent of attendances
1	1	1	1	1	1	1	1	1	13	100.00
1	1	1	1	1	1	1	1	1	13	100.00
•	•	•	•	•	•	•	•	•		0.00
1	1	1	1	1	1	1	1	1	13	100.00
•	•	•	•	•	•	•	•	•		0.00 0.00
1	1 •	1 •	1 •	1 •	1 •	1 •	1 •	1 •	13	100.00 0.00
•										
1	1	1	1	1 •	1	1	1	1	13	100.00
	•				•			•		0.00
1 •	1 •	1 •	1 •	1 •	1 •	1 •	1 •	1 •	13	100.00 0.00
										0.00
1	1	1	1	1	1	1	1	1	13	100.00
1	1	1	1	1	1	1	1	1	12	92.31
1	1	1	1	0	1	1	1	1	11	84.62
1	1	1	1	1	1	1	1	1	13	100.00
1	1	1	1	1	1	1	1	1	13	100.00
1	1	1	1	1	1	1	1	1	13	100.00
1	1	1	1	1	1	1	1	1	12	100.00
0	0	0	0	0	0	1	0	0	3	23.08
0	0	0	0	0	1	0	0	0	3	23.08
13	**13**	**13**	**13**	**12**	**14**	**14**	**13**	**13**		**88.21**

Defence Technology Institute (Public Organization)

Ministry of Defence, the Kingdom of Thailand

O ce of Permanent Secretary of Defence Building (Changwattana)

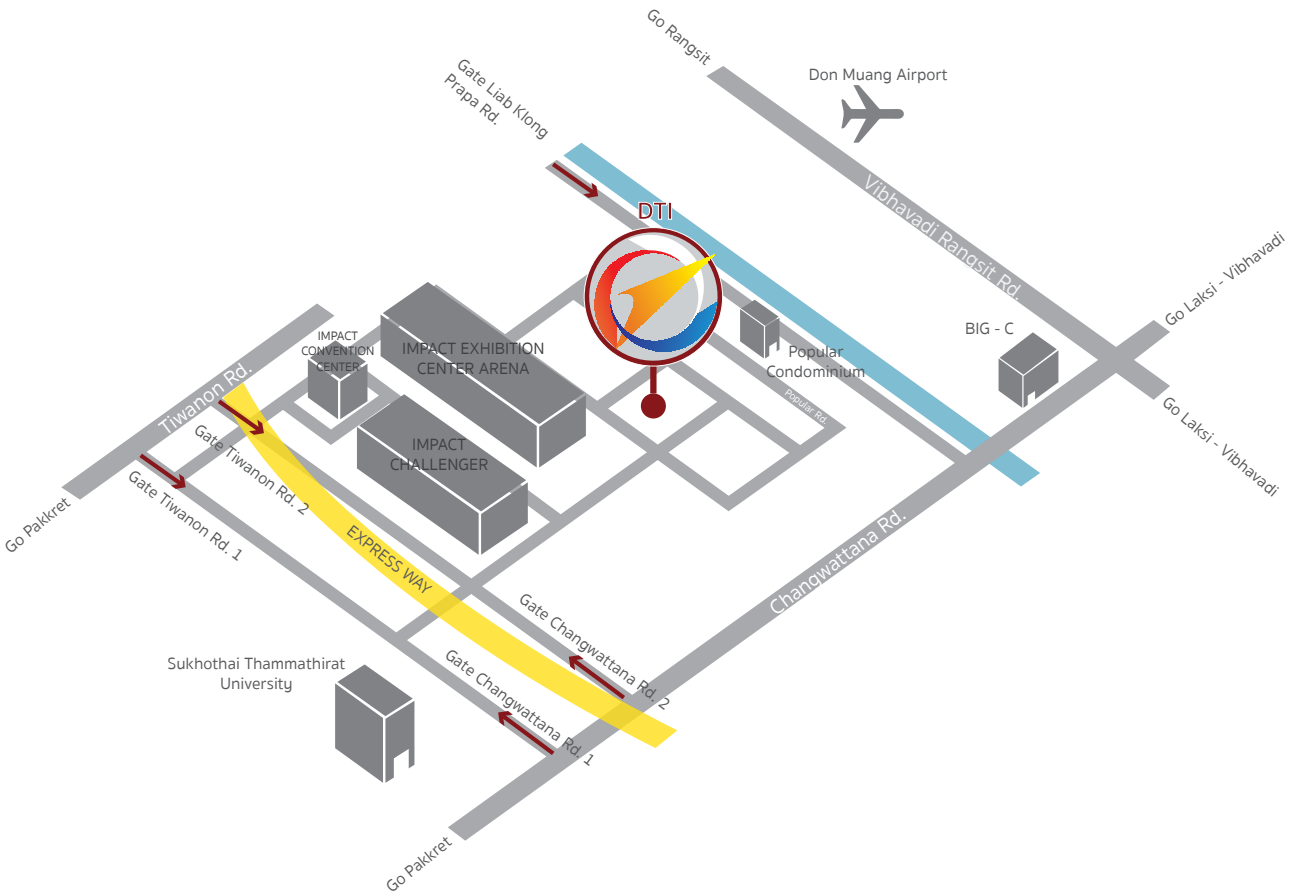
47/433 Moo 3, Banmai, Pakkret

Nonthaburi 11120

Tel. : +66 (0) 2980 6688

Fax : +66 (0) 2980 6688 ext 1300

www.dti.or.th



Defence Technology Institute (Public Organization)

Ministry of Defence, the Kingdom of Thailand

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Defence Technology Institute
(Public Organization) Ministry of Defence, the Kingdom of Thailand

Office of Permanent Secretary of Defence Building (Changwattana)
47/433 Moo 3, Banmai, Pakkret, Nonthaburi 11120

Tel. +66 (0) 2980 6688 Fax +66 (0) 2980 6688 ext 1300
www.dti.or.th