The background of the image is a composite of two futuristic robotic elements. In the upper right, a white and blue industrial robotic arm with a yellow gripper is shown in a blurred, active state. In the lower left, the head of a white humanoid robot is visible, featuring glowing blue eyes and a metallic neck. A large, diagonal orange band cuts across the center of the image, serving as a backdrop for the main title.

THAILAND'S AUTOMATION & ROBOTICS



Thailand Board of Investment
www.boi.go.th

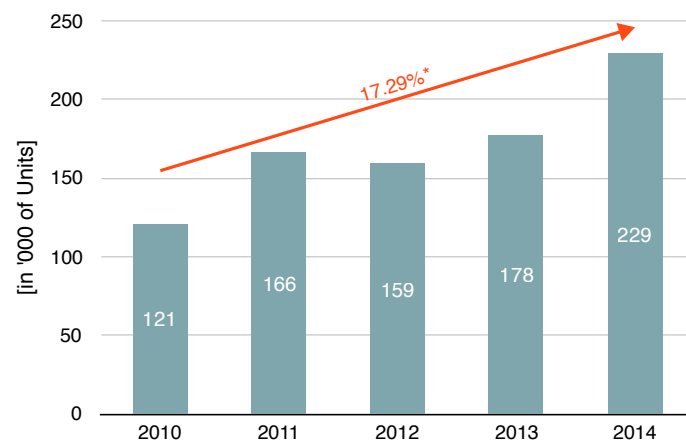
AUTOMATION AND ROBOTICS USHER IN A NEW ERA

Over the past half a century, dynamic advances in automation and robotics have been transforming both business and society. Automation and robotics were initially used to increase productivity on the production floor of factories and utilized simple technologies. Now

however, many corporations around the world are transitioning into Industry 4.0, making use of artificial intelligence, big data management, and the Internet of Things (IoT) to seamlessly work together, to exponentially increase both production and productivity.

Global Industrial Robot Market

Estimated Worldwide Annual Supply of Industrial Robots



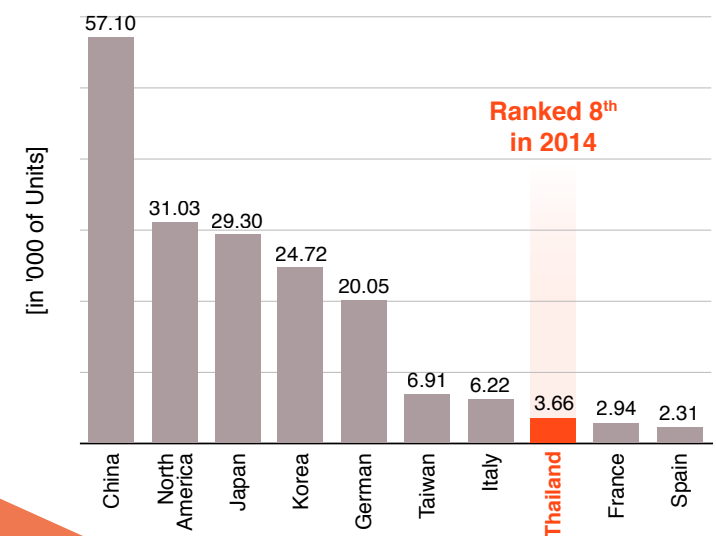
Source: World Robotics 2015

Ranked
8th

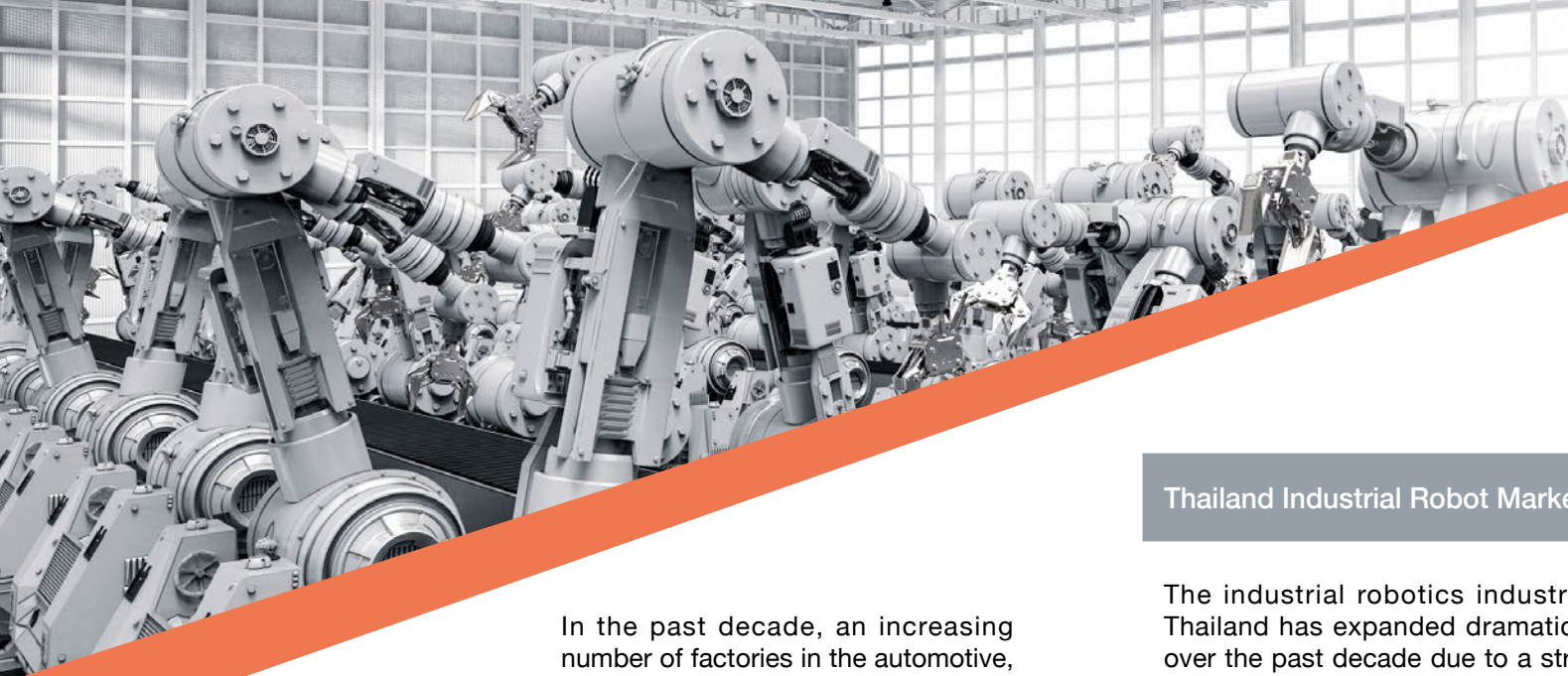
“Thailand Ranked 8th in Global Supply of Industrial Robots in 2014”

Since 2010, the demand for industrial robots has substantially increased as a result of factories' continuous shift toward automation and innovative technical improvements. **There is immense potential for Thailand to expand its market to address rising global demand**, since Thailand's total supply of approximately **3,700 robots** only accounted for less than a quarter of total global robot installations in 2014.

Estimated Yearly Shipments of Multipurpose Industrial Robots in Selected Countries, 2014

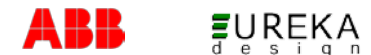


Source: World Robotics 2015

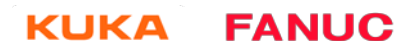


Major Automation and Robotics Companies in Thailand

Manufacturing



Sales Office

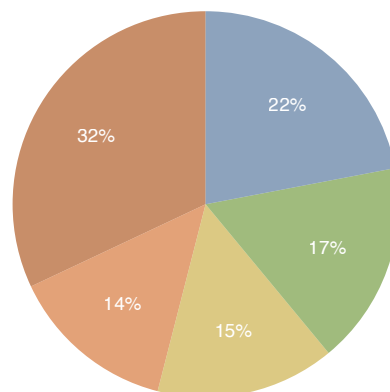


THAILAND: RISING AUTOMATION AND ROBOTICS INDUSTRY

Factories in Thailand have been investing heavily over the past few years in machineries and systems in order to increase the level of process automation and remain competitive in the global manufacturing arena. This has driven market growth in the automation and industrial robot industries in Thailand.

In the past decade, an increasing number of factories in the automotive, electrical and electronics, food and agricultural industries have been **shifting towards automation**, driving up the size of Thailand's automation industry. The machinery and technology in this market that have top demand are conveyors, packing systems, and specialized operations.

Types of Demand for Automation in Thailand

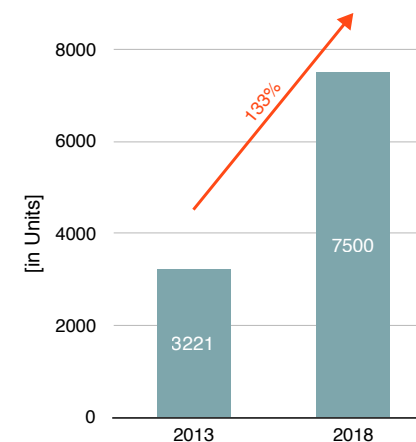


● Conveyor
● Packing
● Specific Task
● Robot Arm
● Others

Source: FIBO

Thailand Industrial Robot Market

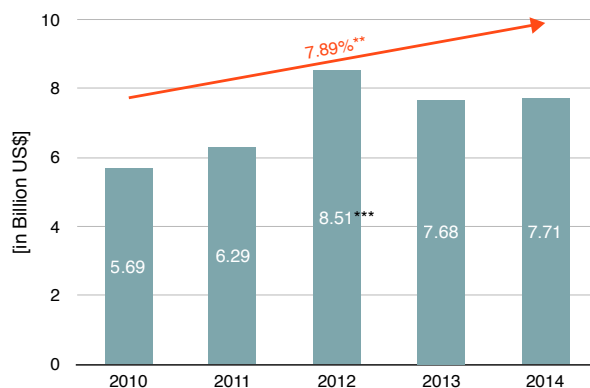
The industrial robotics industry in Thailand has expanded dramatically over the past decade due to a strong customer base. The size of Thailand's shipments of industrial robots is estimated to **increase by 133% from 2,131 units in 2013 to 7,500 units in 2018** *



Note: *International Federation of Robotics

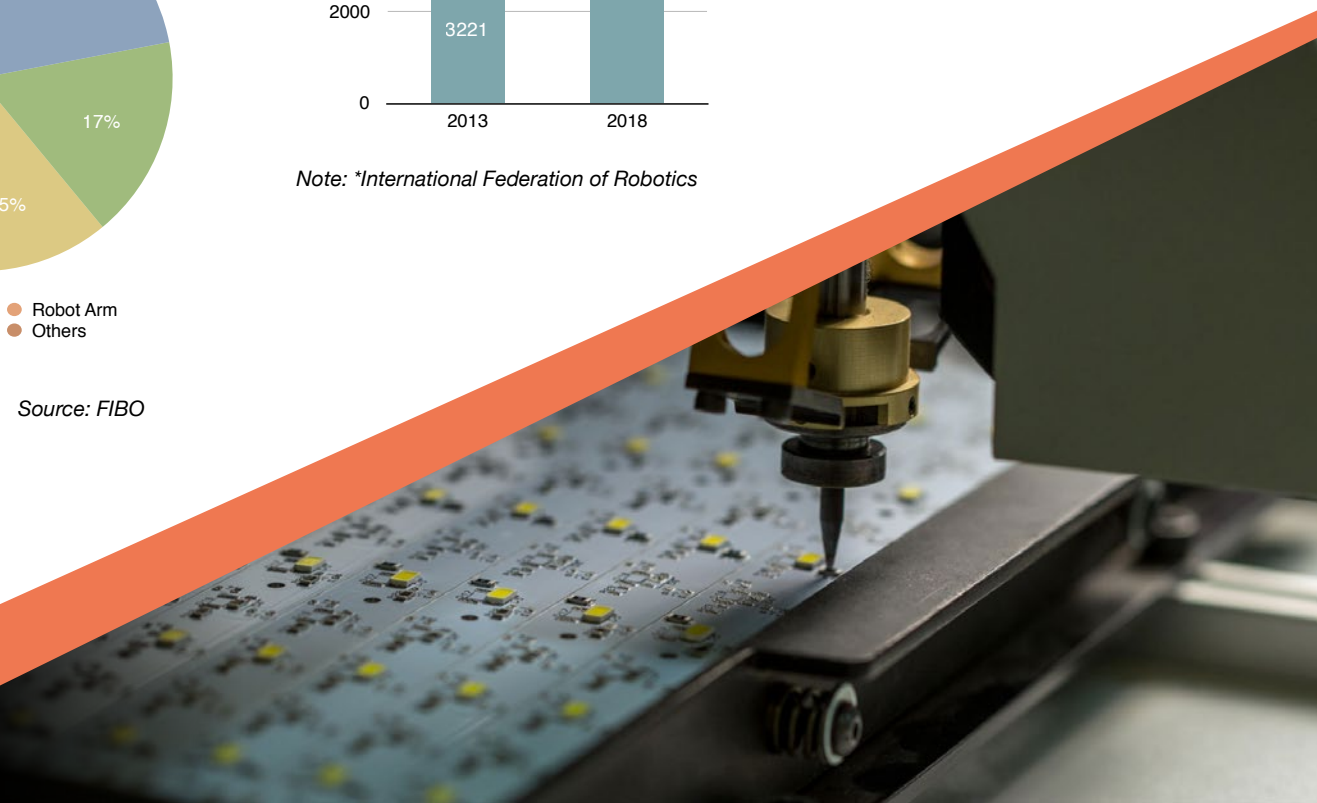
Thailand Automation Market

Import Value of Thai Automation Industry



Source: Thai-German Institute

Note: *Exchange Rate = THB 35.14/ US\$ as of 1st April 2016; **Compound Annual Growth Rate 2010-2014, ***The spike in 2012 is due to extra machine replacements after Thailand mega-flood



WHY THAILAND?

High Demand Driven by Well-Established and Growing User-base

The International Federation of Robotics (IFR) considers the **Automotive** and **Electrical and Electronics industries** to be the two major industries that are responsible for driving global automation and robotics growth; together, these industries have a **market share of 64%**.

Automotive Industry

Since 2010, the **automotive industry** has considerably increased investments in industrial robots worldwide, with an **impressive average sales growth of 27%^{1*}**. This highlights the huge opportunities present in Thailand as it is currently **the largest producer among the ASEAN countries** and is one of the **world's largest production bases** with respect to the automotive industry.

**Ranked
1st**

for motor vehicle
production in
ASEAN²

**Ranked
6th**

globally for
commercial vehicle
production²

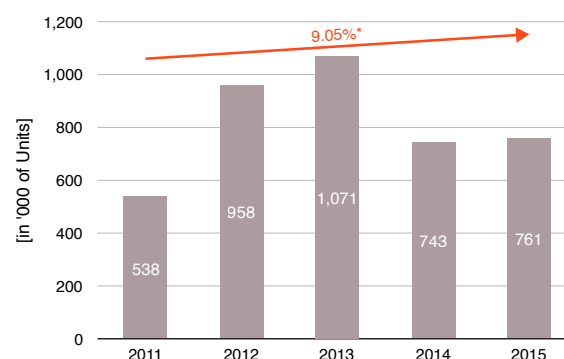
Source:

¹International Federation of Robotics, 2016;

²Automotive Intelligence Unit, Thailand Automotive Institute, 2015

Note: *Compound Annual Growth Rate 2010-2014

Statistics of Automotive Production in Thailand¹



Growing number of production of passenger cars in Thailand, despite the slowdown in the global economy reflects the country's **strength in the automotive industry**, which drives the strong demand in automation and robotics industry.

Electrical and Electronics Industry

In 2014, robot sales with respect to **the electrical and electronics industry increased by 34% to 48,400 units**, reaching a new peak due to the rising demand for electronic products and the need to automate production processes. **Immense opportunities** exist in Thailand as it is the **global production hub** for electrical and electronics.

**Over
US\$12 billion
and
7% growth****
in export value
of electrical &
electronics²

2nd

Largest global
producer and
exporter of hard
disk drives²

Source: ¹Thai Automotive Institute, 2016,

²Electrical and Electronics Institute

Note: *Compound Annual Growth Rate 2010-2015; **Growth 2010-2015;



Specialized Education Program

Availability of Capable Human Resources

With **76 universities and 83 vocational schools**, Thailand produced approximately **82,250 Thai graduates from engineering** and related courses in 2015¹. The country has plenty of **highly skilled engineers and researchers** specializing in automation and robotics and is ready to capture this fast growing market.

The Institute of Field Robotics (FIBO)



FIBO at King Mongkut's University of Technology, Thonburi, offers **Undergraduate and Graduate Programs in Robotics and Automation Engineering**, which seamlessly integrates knowledge in mechanics, electronics, and computers through Project-Based Learning.

With 20 years of experience and **16 best-in-class professors**, FIBO has created successful engineers, researchers, professors, and entrepreneurs that specialize in this field.

Thai Team as World Champions



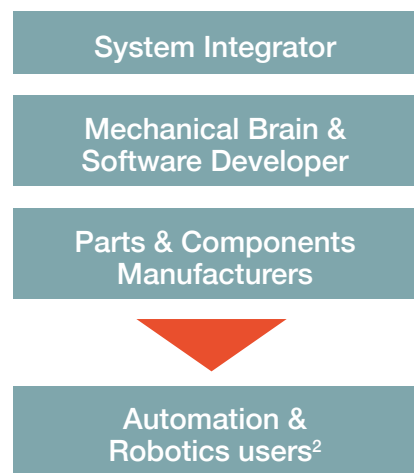
RoboCup is an annual global robotics competition founded in 1997. With an aim to promote robotics and AI research, the competition is divided into different stages, including RoboCup Rescue, RoboCup Soccer, RoboCup Home, etc.

Over the past decade, Thai student teams have won the following competitions:

- **RoboCup Rescue**
8 years Champion: 2016, 2013, 2006-2011
- **RoboCup Soccer**
3 years Champion: 2009-2011
- **RoboCup Home**
8th place, with Best Mobility Award

Source: ¹Ministry of higher education

Supply Chain of Thai Automation & Robotics Industry

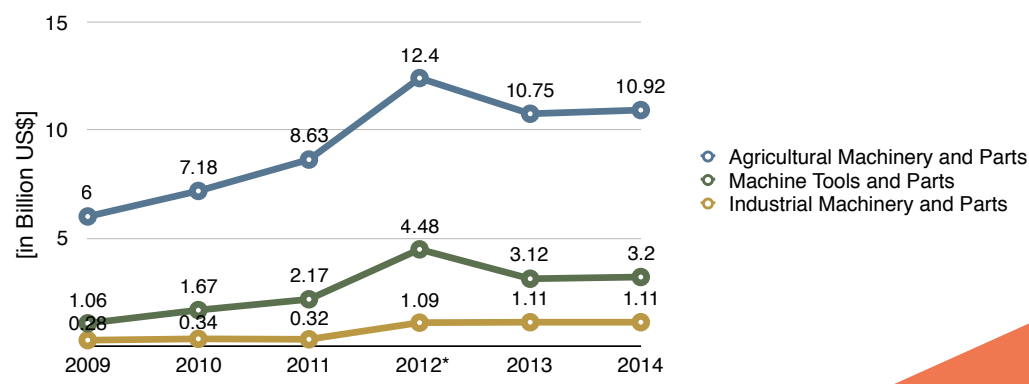


- Automotive manufacturers
- Electrical & Electronic manufacturers
- Food manufacturers
- Etc.

Untapped Area with Great Demand

Currently, the biggest companies in Thailand in many hard industries are investing heavily in automation. **More than 98%** of Thai businessmen in the automation and robotics industry are in the business of **system integration and mechanical brain & software development**. There are massive opportunities for foreign companies to invest in parts & components manufacturing, given the high value and rising demand reflected in the constantly rising imports of machinery and parts.

Thailand Import Value of Machinery and Parts¹



Source: ¹Machinery Intelligence Unit, Iron and Steel Institute of Thailand; ²Thai-German Institute
Note: * The spike in 2012 is due to extra machine replacements after Thailand mega-flood





Excellent Infrastructure and Institutional Support

As one of the government targeted future industries, Thai government and education centers provide continuous support to develop the automation and robotics industry as well as enhance the

capabilities of the country's workforce. Thailand offers various resources for **research and development and human resources training**.

Research Centers

FIBO
The Institute of Field Robotics,
King Mongkut's University of Technology, Thonburi



BART LAB
Center for Biomedical and Robotics Technology Faculty of Engineering, Mahidol University



SKUBA
Intelligent Robotics and Mechatronics Laboratory
Kasetsart University



Regional Center of Robotics Technology
Faculty of Engineering, Chulalongkorn University



Associations and Institutions

 Thai Robotics Society

Supports **research** and **networking** within robotics community and provide **public information** related to robots

 Thai Embedded Systems Association

Developer's **network for electronic design industry** for developers, by developers

 Thai-German Institute

Assists transformation of Thai manufacturing technology and **automation system** to meet with International standards.

 National Science and Technology Development Agency

Supports **R&D** on five target areas, including, agriculture & food, health & medicine, energy & environment, bioresources & community and manufacturing & service Industries

 Thai Machinery Association

Facilitate Thai machinery market, and support research and development of **Thai manufacturing system**

 National Innovation Agency

Support **R&D** of **innovative products** and embed innovative strategic direction of firms

 Asian Institute of Technology

Promotes technological change and sustainable development in the Asia-Pacific region through **higher education**, research and outreach

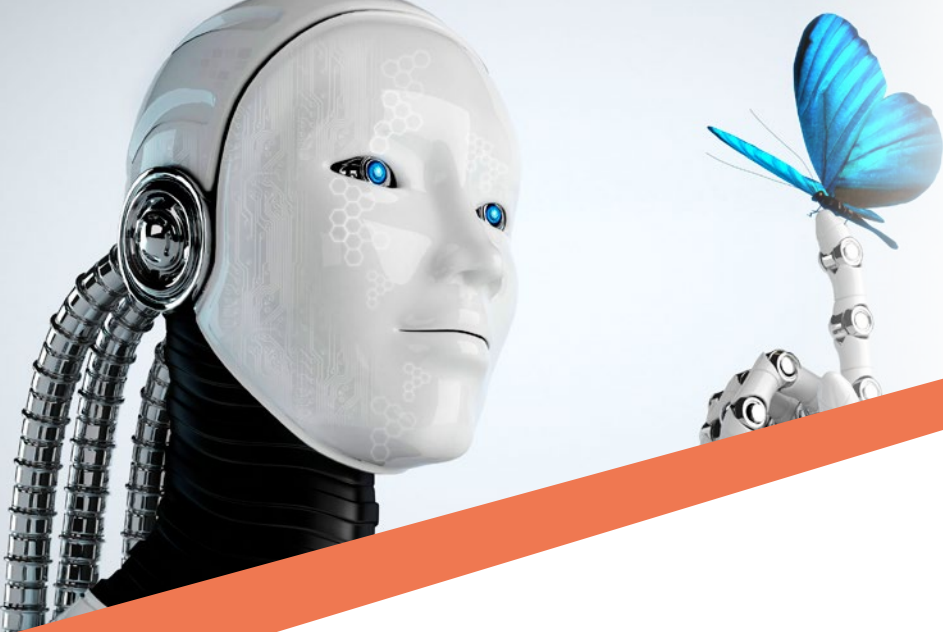
 National Metal and Materials Technology Center

Create and **enhance capabilities in materials technology** through R&D, technology transfer, HRD and infrastructure development

 Electrical and Electronic Products Testing Center

Supports **R&D** and **product testing** of electrical and electronic products





B-HIVE
Pharmacy
Automation
System

to refill medicines at a rate of 20 seconds
per prescription

PREMIER THAI ROBOTS

Thai Medical Robotics

Other than the flourishing industrial robot market, Thailand also offers opportunities to develop **service robots** capable of successfully integrating with people's lifestyles. As the **medical hub of Asia**, Thailand is one of the best destinations to develop medical robotics.

DINSOW
Elderly Care Robot*



- ▶ **1st Authentic Thai Robot**
- ▶ In the process to obtain ISO9001 and CE Mark.
- ▶ Equipped with a camera, infrared and thermal sensors and artificial intelligence

1st Thai company to manufacture and develop commercial service robots that are being exported to Japan and Sweden

Developer:



*Note: * "Today, Dinsow is considered to be number one in the world among elderly care robots," says Mr. Chalermopol Punnotok, founder of CT Asia Robotics Co., Ltd*

FHASAI
Robot-assisted
Therapy for
Children with
Autism Spectrum
Disorders



Winner of medical
robotics idea contest, MedBot 2014

Developer:



**MAHIDOL
UNIVERSITY**
Wisdom of the Land

SENSIBLE TAB
Arm Rehabilitation Robot



- ▶ In the process to obtain ISO 13485 certification

Developer:



BUMBEE
Medical
Dispenser Robot



Developer:



Unmanned Vehicle System

With respect to importing machineries, most Thai companies in the automation and robotics industry are **system integrators**, which presents further investment opportunities for foreign robot manufacturers.



HiveGround Co., Ltd.

Successful System Integration Projects

TIGER SHARK II TYPE 3 UAV



A medium size unmanned aerial vehicle (UAV) with automatic takeoff and landing functions, for Royal Thai Air Force.

ZEABUS AUV

An autonomous underwater vehicle (AUV) for RoboSub 2015 Competition for Kasetsart University & PTTEP PLC.



FLARE STACK INSPECTION DRONE



A safety enhanced flare stack inspection drone for REPCO Corporation Co., Ltd.

INVESTMENT INCENTIVES

BOI Incentives

BOI recognizes the importance of automation and robotics, and offers a wide range of tax and non-tax incentives for projects that meet national development objectives.

GROUP	ELIGIBLE ACTIVITIES	INCENTIVES	
		Corporate income tax exemption	Exemption of import duty*
A1	<ul style="list-style-type: none">Software development and service provision as follow:<ul style="list-style-type: none">- Big data and business process management- IT and Cyber security- Use for controlling and/ or connecting advanced technology equipment. E.g. aerospace, robots, automation, medical devicesResearch and DevelopmentEngineering DesignScientific LaboratoriesCalibration Services	8 years without cap	✓
A2	Automation machinery and/ or automation equipment with engineering design	8 years	✓
A3	Assembling of robots or automation equipment and/or automation parts	5 years	✓

Non-Tax Incentives

These activities also receive the following non-tax incentives:

Permit to bring in expatriates

Permit to own land

Permit to take or remit foreign currency abroad

*Note: *Exemption of import duty on raw or essential materials and machinery used in manufacturing export products*

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