Asian Institute of Technology

58 Moo 9, Paholyothin Highway, Km.42, Klongluang
Pathumthani 12120, Thailand
http://www.ait.ac.th

**Office of Procurement,
Inventory and Assets (OPIA)**
Tel: (66) 02 524 5027-9
Fax: (66) 02-524-5001
purchasing@ait.ac.th

INVITATION TO BID

Date :	8 May 2020	
Re:	**Procurement of Collaborative Robot Arm (Cobot)**	

Term of Reference (TOR)/ Product Specification: attached

Designated contact person for further information

➢ For Bid Information and Submission	Pakkamol Dherapongsthada	pakkamol@ait.ac.th	02-5245029 084-678 8103
	Vasvan Songpitakcahi	vasvan@ait.ac.th	02-5245027 081-646 7272
➢ For Technical Specification	Hoang Hung Manh	manh@ait.ac.th	02-524 5695 089-615 2806

Bid submission: **Date:** **No later than 16.30 hrs. on 8 June 2020**
                Place: Office of Procurement, Inventory and Assets (OPIA)
                   Administration Building, Asian Institute of Technology.

The following documentation must be included in the Bid Envelope;
- Proposed price
- Copy of Company's certificate of commercial registration
- Copy of VAT registration certificate

Bids received after the dates and hours stated above will not be accepted and will be returned unopened to the sender.

Term of Reference (TOR)/ Product Specification:

Product name: Flexible Collaborative Robotic Arms (Cobots)

1.Background

MSIE-CBHE is an Erasmus+ **Curriculum Development of Master's Degree Program in Industrial Engineering** for Thailand Sustainable Smart Industry (MSIE4.0) funded by the European Commission. The project team is formed from a collaborative partnership among 9 universities, three from Europe and 6 from Thailand, who believe strongly in the power of education and innovation to transform lives. They are University of Minho (Portugal), Czestochowa University of Technology (Poland), University Politehnica of Bucharest (Romania), Chiang Mai University, Khon Kaen University, King Mongkut's University of Technology North Bangkok, Prince of Songkhla University, Thammasat University and Asian Institute of Technology.

Curriculum Development of Master's Degree Program in Industrial Engineering for Thailand Sustainable Smart Industry (MSIE4.0) has been selected for EU co-funding for Erasmus+ Capacity Building in Higher Education. More information about the project is at: **https://msie4.ait.ac.th**

THE LABORATORY

A laboratory is being developed as a part of the development of MSIE4.0 with an aim to serve as a hand-on learning platform for the competence development of students. This laboratory locates at the Chalerm Prakiat building, Industrial Systems Engineering, Asian Institute of Technology. The laboratory will **serve the educational purpose,** and will be accessed and used by students and faculty members from 09 members and other new associated partner universities.
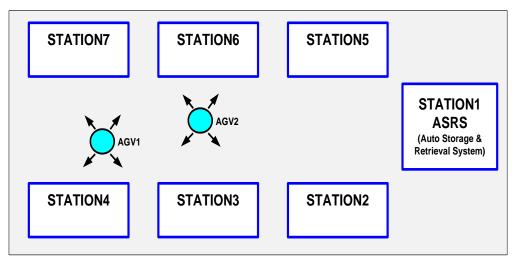

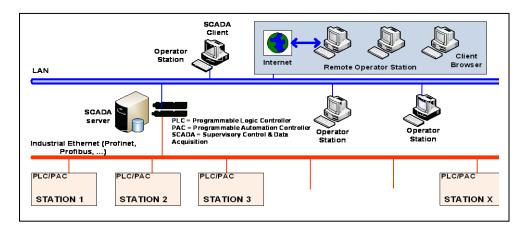Figure 1. Simplified Horizontal Layout of the Laboratory

Figure 2. Simplified Vertical Layout of the Laboratory

The LAB will have an automatic storage & retrieval system (ASRS) and several manufacturing stations (Figure 1), where different manufacturing activities including automation line, AGVs and robotic arms. Most of the stations are equipped with a controller serving as the master of the station (Figure 2). All of them will communicate to each other via modern industrial Ethernet such as PROFINET. Some stations will have their own local operator panels. The supervise control and data acquisition (SCADA) package running in a PC will provide the human machine interfaces (HMI), data archive, remote accesses.

Robotic arms will be mainly used for learning collaborative manufacturing between the two robotic arms, between the robotic arms with other machines, and between the robotic arms and operators. The example of applications are parts assembly, material handling, product picking and placement. It will share the tasks with human, another robotic arm and an AGV (Automatic Guided Vehicle) to move and transport product between station. Furthermore, They will be installed nearly other machine such as 3D printer to assist to do the machine's jobs or load and unload materials and parts instead human. They will interface with PLC controller for remote access, sending and recoding data to server for analysis and optimization purpose.

2.Objective
Therefore, two robotic arms will be needed to support the completion of the MSIE4.0 project. The robotic arms must be flexible, easy to program and set up, and designed for collaboration with operators. Collaborative six jointed-robotic arms are the most preferable. Two different types of grippers will be needed to cover a board learning.

3.Vendor qualification
Vendor shall have experience at least 5 years in service and selling the robotic arm and automation equipment. There are professional team that able to give advice, consulting, installation and programing about robotic arm and automation system. Vendor are the authorized distributor to do business and sell robotic arms from manufacturer which provide the good quality of product under USA, Europe or Japan brand and standard.

4.Specification
- Two Flexible Collaborative Robotic Arms (Cobots) with specification as below.

General specification of a Cobot
- Number of axis is at least 6-axis.
- Maximum payload is at least 5 kg.
- Maximum reaching is at least 700 mm.
- Maximum speed is at least 200 mm/s.
- Input voltage is 220 VAC, 50/60 Hz, single Phase.
- Repeatability of the Cobot is less than ±0.05 mm.
- It can work with accuracy under ambient temperature in the range of 10-40 degree Celsius.
- It shall have force sensors or protection system to stop operating if it comes into contact with human and to avoid damage when it crashes with an object.
- It is also equipped with a force torque sensor at the end-effector.
- It complies with machinery safety standard for unobstructed human-robot collaboration
- General electrical and vacuum grippers can be mounted on its end effector.
- It can be mounted on a table and floor by standard screw or bolt.

Specification of Cobot controller
- Cobot shall have teach pendant that is used with a robot controller to move, program, and run the robot. It must have a touch screen display and an emergency stop switch.
- Controller unit can interface with other machine and device such as external sensor, AGV,3D printer, mini CNC milling machine and welding machine via digital and analog I/O.
- Control unit can communicate with general PC and PLC controller by using standard communication protocol (TCP/IP, Ethernet, Modbus and Profinet).
- Control unit can connect to external device via USB or LAN ports to transfer data or upload program into robot controller.
- There is software for writing, editing and debugging the robot's program. This software can simulate status of digital and analog I/O and view the robot movement with 3D graphic. The software can also install on any PC that are outside AIT campus.
- Control unit is available of 16 digital I/O or more than.
- Control unit is available of 2 analog I/O or more than.

Specification of grippers
- Two grippers are different.
- Both of them are compatible and easy to install on the two cobots.
- The minimum stroke is 50 mm and adjustable.
- The minimum grip force is 20 N and adjustable.
- The minimum carrying load is 5 kg.
- The maximum weight of a gripper 1 kg.
- Both grippers have communication unit.

5.Place and date of deliver

Place

-Vendor shall deliver the product to Chalerm-Prakiat building, Asian Institute of Technology (AIT), Pathumthani, Thailand.

Delivery

-The time of delivery is approximately 30 days after the date of receipt of purchase order.

-Product shall is good and new condition or last year manufacturing. It must never been used for testing or demonstration at anywhere before.

-Vendor shall provide soft copy or hard copy of operation manual, programing and interface manual and maintenance manual in English language to AIT staff.

6. Warranty period

The period of warranty is at least 12 months after the product is installed and tested at AIT Lab.

Technical Support Conditions: Providing one time on-site training, unlimited telephone and email technical support assistance; Providing On-line and Hot-line technical support.

AIT reserves the right of the final decision.