

**Devi Ahilya Vishwavidyalaya, Indore**  
**Institute of Engineering and Technology**

Tender Document

February 2020



**Institute of Engineering and Technology**  
**Devi Ahilya Vishwavidyalaya**

**Khandwa Road, Indore ( M.P.)**

Phone No.:91-731-22361116/17/2764385

Website : [www.ietdavv.edu.in](http://www.ietdavv.edu.in)

Email: [stokekar@ietdavv.edu.in](mailto:stokekar@ietdavv.edu.in)

**Devi Ahilya Vishwavidyalaya  
Institute of Engineering and Technology**

To,

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**Ref: Tender Enquiry No: DAVV/IET/EYANTRA/2019-20/5**

Dated: 20/02/2020

S.N.	Name of Equipment	Quantity	Technical Details
1	E-Yantra Robotics lab Equipments		Annexure A

Dear Sir,

Tender forms can be downloaded from **mptenders.gov.in**. Tender to be submitted online through **mptenders.gov.in** along with tender fee and EMD.

**Section 1: General terms and conditions applicable for all items:**

- 1 Rates quoted should be inclusive of all taxes and other charges for delivery and installation F.O.R. IET-DAVV, Indore. Mode of payment shall be Online/Cheque after receipt of goods.
- 2 Vendors are requested to read specifications carefully and submit quotations as per the specifications given.
- 3 All the pages of quotation must have seal and name & signature of the authorized person.
- 4 The complete detailed specifications along with accessories, if any, be clearly mentioned in the quotation giving the guarantee/ warranty period. Facilities for service should also be indicated. Detailed technical information, Brochures, leaflets, and drawings whichever is applicable must be furnished along with tender(s). **Bids will be rejected if detailed technical specifications and brochure are not attached.**
- 5 The vendor should enclose the certificate of authorization for dealership, sole manufacturer or propriety item.
- 6 No claim for any tax or duty, not stipulated in the tender will be admitted at any stage.
- 7 Vendor will furnish the list of addresses along with purchase order (if any), where similar equipment/software has been supplied or work has been carried out in the past.
- 8 University reserves the right to invite on its own the bids directly from Internationally/Nationally recognized top listed companies or manufacturers and select the reputed brands as suggested by its technical committee/experts.

- 9 We do not intend to call vendors for financial negotiations. **Vendor should, therefore, quote their lowest possible rates inclusive of taxes and other charges. The final price should be inclusive of discount for educational institute, if any.** However, technical discussion may be held, if felt necessary by the technical committee.
- 10 For each item, tenders are to be submitted as per details given on [mptenders.gov.in](http://mptenders.gov.in).
- 11 **All the equipments/Components specified in the tender document will be treated as combined items. No individual equipments/Components will be purchased from separate vendors.**
- 12 Delivery period must be mentioned against each item. After the order has been placed the goods must be delivered within the stipulated period.
- 13 Ordinarily, the payment is made after the goods have been received and inspected at destination. In case the goods are rejected these have to be removed by the vendors at their cost. The rejected goods must be replaced by the vendor within 15 days of dispatch of registered notice intimating that the goods have been rejected, failing which the order may be cancelled.
- 14 Unless otherwise stipulated the tender should be valid for at least 120 days from the due date of opening of the tender.
- 15 All disputes shall be subject to Indore Jurisdiction.
- 16 **Without EMD, the tender shall be considered as invalid. EMD deposit is compulsory even if the option of EMD exemption available on [mptenders.gov.in](http://mptenders.gov.in) portal.**
- 17 Tender received after due date will not be considered.
- 18 Instruction manuals containing instructions for installation, operations, part list and instructions for trouble shooting must be supplied and included in the cost of the equipment.
- 19 DAVV reserves the right to change the quantity of items as per the requirement.
- 20 Any revisions, corrigendum to the tender will be posted on the above website only and will not be published in any other media.

The vendor is requested to read all terms and conditions carefully before submitting the tender. Clarification (if any) may be sought out during office hours from Institute of Engineering and Technology, Devi Ahilya Vishwavidyalaya, Khandwa Road, Indore before submitting the tender.

**Director**  
**Institute of Engineering and Technology**  
**Devi Ahilya Vishwavidyalaya**  
**Indore**

## Section 2: Letter of Invitation

Dated: 20/02/2020

Dear Sir/Madam:

1. Institute of Engineering and Technology, Devi Ahilya Vishwavidyalaya, Khandwa Road, Indore invites e-tenders, under online system, from eligible bidders for Supply of “**E-Yantra Robotics lab Equipments**” mentioned in the tender.
2. Other details are as under:

<b>Sr. no.</b>	<b>Items</b>	<b>Description</b>
1	Cost of tender document	Rs. 1000.00 (non-refundable) through mptenders.gov.in (online)
2	Last date of submission of tender	<b>12/03/2020 by 5:00 P.M.</b>
3	Earnest Money Deposit	Rs 15,000 /- through mptenders.gov.in (online)
4	Date of Opening Technical bid	<b>13/03/2020 by 4:00 P.M</b>
5	Date of Opening Financial bid	<b>Will be notified later</b>

3. Tenders shall be valid for a period of not less than 120 days from the date of opening of tender (online bids). Tenders submitted without Earnest Money Deposit will be rejected.
4. Financial bid will be opened only for successful Bidders, who will be selected on the basis of technical committee report.

**Director**  
**Institute of Engineering and Technology**  
**Devi Ahilya Vishwavidyalaya,**  
**Indore**

### **Section 3. Instruction to Bidders:**

1. The Agencies are expected to examine this tender document in detail, while preparing their technical and financial proposal. Material deficiencies in providing the Technical or financial information may result in rejection of the proposal.
2. Proposals received after due date will be summarily rejected. University shall not be responsible for any delay in postal services.
3. The Agencies are required to submit the online tenders in following manner. There will be two stages. Content of one envelope to be submitted in hard copy along with online submission is as below:

**1) Envelope 1 should have the following:**

- 1. Detail of online tender fee and EMD deposit.**
- 2. Form 1 and Form 2.**
- 3. Self-attested copies of PAN and GSTIN**
- 4. Form no 3 ( for Technical bid)**
- 5. Annexure B ( for Technical compliance)**
- 6. Original manufacturer (OEM) / Proprietary item certificate/ Authorized vendor certificate**
- 7. Technical Manuals/Brochures/ Past Purchase orders/ Other relevant documents**

This envelope has to send to Director, Institute of Engineering and Technology, Devi Ahilya Vishwavidyalaya, Khandwa Road, Indore -452017 (M.P) and should reach before the last date.

**Scanned copies of all the documents send by post/speed post/courier mentioned above should be uploaded in .pdf format on [mptenders.gov.in](http://mptenders.gov.in) portal.**

- 2) Online submit the financial bid in prescribed BOQ format (.xls).** Do not submit financial bid in hard copy as bid will be rejected.

**Note: The technical proposal shall not include any financial information.**

Any correction/overwriting should be attested by the person signing the documents, failing which the tender will be rejected without any notice. Use of correcting fluid is strictly prohibited. All the pages must have seal, name and signature of the authorized person.

The university reserves all the rights to accept/reject any/all/part of tenders without assigning any reason. The bidders are required to submit the required details strictly in the specified format, failing which their tender is likely to be rejected.

#### **Section 4: General Conditions for bidders**

- 1.The individual signing the Tender Document and other documents on behalf of the bidder should submit proof in support of his /her authority.
- 2.No interest would be payable for any period on EMD. The amount of EMD will be refunded only after finalisation of tenders. The EMD in case of successful bidder may be adjusted against security deposit.
- 3.All disputes shall be subject to Indore jurisdiction.
- 4.The payment will be made against delivery followed by successful installation of the software and hardware items and the verification of the goods against the order. For imported instruments, LC can be opened, if the amount is to be paid in foreign currency.

**Form - 1**

**(To be kept in Envelope-1)**

General Information about the bidder

<b>S.No.</b>	<b>Particulars</b>	<b>Details</b>
1	Name and Address of the Bidder	
2	Name and Mobile number of the contact person	
4	Office Telephones	
5	Fax Number	
6	e-mail address	
7	Name of the Chief Executive and Telephone No	
8	Name(s), contact number and address(s) of proprietor or Directors.	
9	1. GSTIN No.	
	2. Commercial Tax / CST No.	
10	Income Tax PAN No.	
11	List of Major Clients and Size of Orders executed in brief.	

Use separate sheet and attach proof where ever required.

**Signature of Bidder  
With Stamp & Seal**

**Form 2**

**Item number :**

**(To be kept in Envelope-1)**

1. Name of Organization : .....

2. Address : .....  
.....  
.....

3. Details of online payment, in favour of Registrar, DAVV payable at Indore.

i) Tender form price Rs. 1000/-

a. Name of Bank & Branch: \_\_\_\_\_

b. date: \_\_\_\_\_

c. Reference ID: \_\_\_\_\_

ii) EMD: Rs 15000/-

a. Name of Bank & Branch: \_\_\_\_\_

b. date: \_\_\_\_\_

c. Reference ID: \_\_\_\_\_

4. Contact person name and phone number : \_\_\_\_\_

Signature: .....

Name: .....

Date: .....

Seal:



**Form 3**

**Item number :**

We are ready to supply the item as per the specifications mentioned below:

<b>S.No.</b>	<b>List of specifications and accessories for each item</b>	<b>Supplying Items (Yes/No)</b>
1.	i) ii) iii) iv) v) vi)	

Signature \_\_\_\_\_

Date:

Name \_\_\_\_\_

In capacity of \_\_\_\_\_

Name of the organization & seal

# TECHNICAL SPECIFICATIONS

## Annexure A

### 1. E-Yantra Robotics lab Equipments

#### 1.1 FIRE BIRD V ATMEGA2560 Robotic Research Platform

Qty= 03

##### Specifications

###### Microcontroller

Atmel ATMEGA2560 as Master microcontroller, Atmel ATMEGA8 as Slave microcontroller

###### Sensors

Three white line sensors (extendable to 7)

Five Sharp IR range sensor (80cm)

Eight analog IR proximity sensors (20cm)

Eight analog directional light intensity sensors

Two position encoders (extendable to four)

Battery voltage sensing

###### Indicators

2 x 16 Characters LCD, Indicator LEDs, Buzzer

###### Control

Autonomous Control, PC as “Master” and Robot as “Slave” in wired or wireless mode

Distributed (multi robot) communication

###### Communication

USB Communication, Wired RS232 (serial) communication

Simplex infrared communication (From infrared remote to robot)

###### Power

9.6V, 2100mAh Nickel Metal Hydride (NiMH) battery pack and external Auxiliary power using battery charger.

###### Locomotion

Two DC geared motors in differential drive configuration and caster wheel at front as support

###### Software Support

AVR Studio, GUI based control, Microsoft Robotic Developer Studio (MRDS), MATLAB

###### Accessories

Documentation CD, USB Programmer (ISP), Smart NiMH battery charger with power adaptor, Serial cable, USB cable, Flex printed 6 feet white line

#### 1.2. Fire Bird V ATMEGA2560 Tank Drive Robotic Research Platform

Qty=1

##### Specifications

###### Microcontroller

Atmel ATMEGA2560 as Master microcontroller, Atmel ATMEGA8 as Slave microcontroller

###### Sensors

Three white line sensors (extendable to 7)

Five Sharp GP2D12 IR range sensor (80cm) (

Eight analog IR proximity sensors (20cm)

Eight analog directional light intensity sensors

Two position encoders (extendable to four)

Battery voltage sensing

###### Indicators

2 x 16 Characters LCD, Indicator LEDs, Buzzer

###### Control

Autonomous Control, PC as “Master” and Robot as “Slave” in wired or wireless mode

Distributed (multi robot) communication

###### Communication

USB Communication

Wired RS232 (serial) communication

Simplex infrared communication (From infrared remote to robot)

**Power**

11.1V, 500mAh 20C Lithium Polymer battery pack with smart battery charger NR-BLIC-03

**Locomotion**

Two DC geared motors in differential drive configuration, Tank track width: 38mm, Tank track height: 54mm

**Software Support**

AVR Studio, GUI based control, Microsoft Robotic Developer Studio (MRDS), MATLAB

**Accessories**

Documentation CD, USB Programmer (ISP), Smart NiMH battery charger with power adaptor, Serial cable, USB cable, Flex printed 6 feet white line

**1.3. Fire Bird V ATMEGA2560 4 Wheel Drive Robot with Gripper****Qty=1****Specifications****Microcontroller**

Atmel ATMEGA2560 as Master microcontroller, Atmel ATMEGA8 as Slave microcontroller

**Sensors**

Three white line sensors (extendable to 7)

Five Sharp GP2D12 IR range sensor (80cm)

Eight analog directional light intensity sensors

Two position encoders (extendable to four)

Battery voltage sensing

**Indicators**

2 x 16 Characters LCD, Indicator LEDs, Buzzer

**Control**

Autonomous Control, PC as “Master” and Robot as “Slave” in wired or wireless mode

Distributed (multi robot) communication

**Communication**

USB Communication

Wired RS232 (serial) communication

Simplex infrared communication (From infrared remote to robot)

**Power**

7.4V, 1300mAh, 20C Lithium Polymer battery pack with smart battery charger NR-BLIC-03

**Locomotion**

Four geared DC motors in 4 wheel differential drive configuration

**Gripper Assembly compatible to the robot.**

**Software Support**

AVR Studio, GUI based control, Microsoft Robotic Developer Studio (MRDS), MATLAB

**Accessories**

Documentation CD, USB Programmer (ISP), Smart NiMH battery charger with power adaptor, Serial cable, USB cable, Flex printed 6 feet white line

**1.4. Spark V Robot****Qty=5****Specifications**

**Microcontroller:** ATMEL ATMEGA16A

**Programming:** Using Bootloader Utility

**Sensors:**

Three white line sensors  
Three IR proximity sensors  
Three directional light intensity sensors  
2 Position encoders with 12.97mm resolution  
Battery voltage sensing  
TSOP1738 IR receiver for TV remote control

**Indicators:**

2 x 16 Characters LCD, Indicator LEDs,Buzzer, Battery low indication

**Locomotion:**

Two DC geared motors and caster wheel as support.

**Operational Modes:**

Standalone (Autonomous Control), PC as master and robot as slave  
Distributed (multi robot communication)

**Communication:**

USB, Wired RS232 (serial) communication at TTL level.  
Simplex infrared communication (From infrared remote to robot) (support code not included)

**Power:**

7.2 V 600 mA rechargeable NiMH battery, Onboard Smart Battery Controller

**Accessories**

Documentation CD, USB Cable, 12V/1 Amp Charging Adapt

**1.5. 4 Axis Robotic Arm**

**Qty=3**

**Specifications**

Number of Axis: 4 + Gripper  
Gripping force: 250gms (Maximum)  
Gripping jaw length: 43mm  
Gripping jaw width: 60mm  
Payload: 155gms  
Weight: 455gms (Including servo motors)  
Operating voltage: 5V to 6V  
Reach: 29cm

**1.6. Parallel Gripper Assembly**

**Qty=3**

**Specifications**

Gripping size: 30mm  
Gripping force: 250gms (Maximum)  
Gripping jaw length: 30mm  
Gripping jaw width: 19mm  
Weight: 98gms (Including servo motors for gripping and twisting)  
Operating voltage: 5V to 6V

**1.7. Heavy Duty Robotic Arm with Controller and Accessories**

**Qty=1**

**Specifications**

Number of Axes - 5 axes plus servo gripper  
Axis Movement  
Axis 1: Base rotation- 180°  
Axis 2: Shoulder rotation- 180°  
Axis 3: Elbow rotation- 180°  
Axis 4: Wrist pitch- 180°  
Axis 5: Wrist roll- 180°  
Maximum Operating Radius-320mm  
End Effector-  
DC servo motor based gripper with Parallel finger motion  
Maximum Gripper Opening- 55mm  
Actuators-5VDC servo motors  
Motor Capacity (axes 1-4)- 15Kg/cm  
Motor Capacity (axes 5)- 7Kg/cm  
Motor Capacity (gripper)- 7Kg/cm  
Total number of Servo Motors-9  
Maximum Payload-50gms  
**Accessories:**  
Servo control card, 5V-25A, 12V-5A SMPS  
Two flex sheets with polar and rectangular coordinate systems  
Documentation CD, USB Cable

## 1.8. Camera Pod

Qty=1

### Specifications

Span angle of Pan servo motor : 180 Degrees from left to right and vice versa  
Span angle of tilt servo motor : 180 Degrees from front to rear and vice versa  
Compatible with Firebird V series robot

## 1.9. Universal Sensor Pod

Qty=3

### Specifications

Span angle of Pan servo motor : 180 Degrees from left to right and vice versa  
Span angle of tilt servo motor : 180 Degrees from front to rear and vice versa  
Compatible with Firebird V series robot

## 1.10. Wireless camera

Qty=1

### Specifications

Video Camera Parts: 1/3" 1/4" Image Sensors  
System: PAL/CCIR NTSC/EIA  
Effective Pixel: PAL: 628X582 NTSC: 510X492  
Image Area: PAL: 5.78X4.19mm NTSC: 4.69X3.45mm  
Horizontal Definition: 380 TV Lines  
Scanning Frequency: PAL/CCIR: 50HZ NTSC/EIA: 60HZ  
Minimum Illumination: 3LUX  
Sensitivity: +18DB-AGL ON-OFF  
Output Electrical Level: 50mW  
Output Frequency: 1.2G/2.4G  
Transmission Signal: Video, Audio  
Linear Transmission Distance: 50-100m  
**Wireless camera receiver**  
Reception Sensitivity: +18DB  
Receiving Frequency: 1.2G/2.4G  
Composite video and audio output  
Antenna:50ohm SMA

## 1.11. Ultrasonic Sensor Module

Qty=3

### Specifications

Resolution: 1-cm  
Data refresh rate: up to 40Hz  
Range: 20cm to 765cm (25 Feet)  
Sensor operates at 42kHz  
Virtually no sensor dead zone, objects closer than 20 cm will typically range as 20 cm  
Operating voltage: 3V-5.5V  
Average current requirement: 4.4mA  
I2C bus communication allows rapid control of multiple sensors with only two wires.

### **1.12. 3 axis Accelerometer and 3 axis Magnetometer Module**

**Qty=3**

#### **Specifications**

Onboard 3.3V Low Drop voltage regulator with input range of 3.6V to 6V.  
Logic supply voltage range of 1.8 to 3.3V.  
3 magnetic field axis and 3 acceleration axis  
Full scale range of  $\pm 1.3$  to  $\pm 8.1$  gauss magnetic field  
 $\pm 2g/\pm 4g/\pm 8g/\pm 16g$  user selectable full-scale acceleration ranges  
16 bit data output  
I2C serial interface  
Power-down mode/ low-power mode  
2 independent programmable interrupt generators for free-fall and motion detection  
Embedded temperature sensor  
6DOF orientation detection

### **1.13. 3 Axis Digital Gyroscope Module**

**Qty=3**

#### **Specifications**

Onboard 3.3V Low Drop voltage regulator with input range of 3.6V to 6V.  
I2C/SPI digital output interface  
Three selectable full scales (250/500/2000dps)  
Sensitivity:  
250 dps : 8.75 mdps/digit  
500 dps : 17.50 mdps/digit  
2000 dps : 70 mdps/digit  
16 bit data output  
Embedded temperature sensor with 8-bit temperature data output  
Integrated low- and high-pass filters with user selectable bandwidth  
Embedded power-down and sleep mode

### **1.14. SHARP IR Sensors**

**Qty=6**

#### **Specifications**

Distance measuring range: 10 to 80cm  
Analog output type  
Refresh rate: 36ms  
Supply voltage: 4.5 to 5.5 V  
Average current consumption: 33 mA

### **1.15. XB Wireless module**

**Qty=3**

#### **Specifications**

Serial UART TTL / CMOS interface (3.3V / 5V complaint).  
Supply voltage: 3V3 – 5.5V  
127 separate channels for interference free and secure communication  
Open area transmission distance: 40 Meters (RF line of site)

## **1.16. 360 Degree Laser Scanner**

**Qty=1**

### **Specifications**

Distance Range: 0.15 - 8 m  
Angular Range: 0-360 degree  
Distance Resolution: <0.5 (0.15~1.5 meters)  
<1% of the distance (All distance range)  
Angular Resolution: 0.9degree  
Sample Duration: 0.25 millisecond  
Sample Frequency 4000Hz  
Scan Rate: 10Hz  
Requires at least 1.5A@5V  
UART communication interface

## **1.17. GPS Receiver Module**

**Qty=2**

### **Specifications**

Supply: 3.3V  
3D Fix Indicator LED & Power LED  
On board Lithium Battery to quickly acquire GPS information on start up  
Antenna: High gain GPS patch antenna  
Data output: UART interface at 3.3V (not RS232)  
Protocol: NMEA-0183@9600bps (Default) at update rate of 1 second.  
Protocol message support: GGA, GSA, GSV, RMC, VTG  
L1 Frequency, C/A code, 66 channels  
Tracking Sensitivity: On-module antenna : -165 dBm  
Position Accuracy : 3 m  
Max. Update Rate: Up to 10Hz(Default: 1 Hz)  
Time to First Fix (Open sky and stationary position)  
Obscuration recovery: 0.1 second average  
Hot start: <1 seconds average  
Warm start: <34 seconds average  
Cold start: <35 seconds average

