

1. **Name of the technology:** Robotic Kit for Automated Driving.
2. **Developed by DRDO Lab/ Estt Name:** Vehicles Research and Dev. Establishment, Ahilyanagar - 414006, Maharashtra State.
3. **Brief write-up (100-150 words) :**

VRDE, Ahilyanagar, a premier research establishment under DRDO, has developed the technology, "Robotic Kit for Automated Driving (RKAD)", which is an appliqué kit/ strap-on kit to convert manned-conventional vehicle into an un-manned autonomous vehicle, in a shorter time and across class of vehicles (LMV and HMV) by way of retrofitted modular drive-by-robots.

The system/ technology comprises of (i) Modular and retrofit drive-by-robots for standard vehicle controls like acceleration, brake, clutch, steering and gearshift (ii) Automation System (iii) Test platform for RKAD control system.

4. **Salient feature :** The salient features of RKAD system/ technologies are as below:

<b>A. ROBOTIC KITS</b>	
Veh. Category	(i) Light Motor Vehicle (LMV) (ii) Heavy Motor Vehicle (HMV)
Driving Robots	<ul style="list-style-type: none"> <li>• Modular Drive-by-Robots (Pedal Robots for Accelerator, Brake, Clutch, Steering Robot, Gearshift Robot ) separate for each class of LMV and HMV</li> <li>• Calibration modules for drive-by-wire robots</li> </ul>

<b>B. AUTOMATION SYSTEM</b>	
Modes of operation supported	<ul style="list-style-type: none"> <li>• Remote: (Human-in-loop) with clear LoS control operated by a driver at the Ground Control Station</li> <li>• Tele-op: (Human-in-loop) with non LoS control Operated by a driver at the Ground Control Station</li> <li>• Semi-autonomous: (Human-on-loop) Waypoint Navigation in defined environment with static obstacle detection and avoidance (with provision for manual override by a driver at the Ground Control Station)</li> </ul>
Sensor Interfaces	<ul style="list-style-type: none"> <li>• 3D LiDAR–(Velodyne 32 ch) as primary sensor for obstacle avoidance</li> <li>• GNSS/INS integrated module with multi-constellation support</li> <li>• Day Camera for Tele-operation</li> </ul>
Safety features	<ul style="list-style-type: none"> <li>• Obstacle avoidance, Health monitoring, Geo-fencing</li> <li>• Emergency Stop on link failure, Auto Stop, Fail safe brake</li> </ul>
HMI	<ul style="list-style-type: none"> <li>• Portable Operator Control Unit (Mission Plan, Command &amp; Control)</li> <li>• Joystick operated remote/tele-op command &amp; control</li> </ul>
<b>C. TEST PLATFORM FOR RKAD CONTROL SYSTEM</b>	
Configuration	Wheeled, 6x6 all electric drive automotive platform 72 V, 150 Ah, LiFePO4 Battery x 2
Dimensions	
(a) Length	3410 mm
(b) Overall Width	1750 mm
(c) Height to Highest Point	1200 mm
Performance	

(a) Max Speed	37.59 kmph (under test conditions)
(b) Ground Clearance	260 mm
(c) Gradient	25 <sup>0</sup> (2001 kg GVW (laden) - under test conditions)
(d) Vertical Step Crossing	200 mm
(e) Trench Crossing	500 mm
(f) Side Gradient/slope	17 <sup>0</sup>
Kerb weight	1200 kg
Payload Capacity	Max payload: 700 kg, Area: 1250mm (L) x 1000mm (W)
Endurance with 2000 kg GVW (laden)	<b>Silent / Battery Mode:</b> (under test conditions) Range: 145 km Duration: 5 hours Avg speed: 29 kmph

5. **Good Quality Picture (if any):**



6. Min Facility/ Capability required at the time of submission: **System Integration capability**

7. Requirements of Technology Absorption Certificate (if any) and accordingly number of samples/ product/ prototype required to issue certificate. Cost of sample and testing & evaluation cost to be borne by ToT recipient industry - Not **Applicable**

1. **Industries are requested to submit their expression of Interest for ToT within 21 days of publishing of technology on DRDO web-page.** Interested companies/ industries are requested to apply against this EoI alongwith 'Application cum Industry Assessment Form' given in Annexure-II of Appendix 'D' to following address:-

To,

**Director  
Vehicles Research & Development Establishment (VRDE)  
PO: Vahan Nagar  
Ahilyanagar  
Maharashtra 414006  
Phone no: 0241-2544004  
Fax No: 0241-2548410  
Email ID: director.vrde@gov.in**

2. A copy of interest may be sent to the following address without any attachment:-

To,

**The Director,  
Directorate of Industry Interface & Quality Management (DIIQM),  
Room No. 447, DRDO Bhawan, Rajaji Marg, New Delhi-110 011  
E-mail: diitm.hqr@gov.in  
Phone No. 011-23007446  
Fax-011-23793008**

All industries are requested to fill in the form the given below and provide supporting documents (as applicable). Kindly provide the reference of page no. of supporting documents in the relevant field of form. The list of documents to be attached is provide in annexure-I.

**PART-1**

**General Information**

(Please enclose documents in support of information provided)

1.	<b>Name of the Technology requested for Technology Transfer (Technology name and concerned Lab, Category)</b>	
2.	<b>Name of the industry/ organization</b>	
3.	<b>Complete Address and other details</b>	
	<b>Registered Office</b> State Phone No Fax Email Website	
	<b>Factory</b> State Phone No Fax Email Website	
4.	<b>Point of Contact</b> Name Designation Address Mobile No Ph No Email ID	
5.	<b>NAME OF CMD/ MD /PARTNERS/ PROPRIETOR/ etc</b> Name Designation Address Mobile No Ph No Email ID	
6.	<b>Date of Incorporation of company</b>	
7.	<b>Foreign Direct Investment in company (if any in %)</b>	
8.	<b>Shareholding pattern</b>	
9.	<b>Turn over as per Audited Balance Sheet for the preceding three years.</b> Year _____ Year _____ Year _____	
10.	<b>Annual budget for R&amp;D during last three years (if any)</b>	

	Year _____ Year _____ Year _____	
11.	<b>Income Tax returns for the preceding three years period</b> Year _____ Year _____ Year _____	
12.	<b>Nature of company</b> DPSU, Private Limited, Public Limited, Partnership, Proprietary, Ex- Serviceman Unit	
13.	<b>Category of industry</b> Large Scale, Medium Scale, Small Scale, Micro, Startup	
14.	<b>MSME Registration No</b>	
15.	<b>Certificates of registration as a manufacturing unit, if any.</b>	
16.	<b>If Startup, DPIIT Registration No</b>	
17.	<b>UDYOG AADHAR No</b>	
18.	<b>PAN Number</b>	
19.	<b>Details of Industrial license for defence manufacturing issued by DPIIT (if any)</b>	
20.	<b>Details of PESO license (if any)</b>	
21.	<b>GST Number</b>	
22.	<b>Nature of business</b> Manufacturing/ Sole Selling or Authorized Agent/ Assembler/ Traders/ Dealer/ Processor/ Repacker/ Others	
23.	<b>Details of current products and services</b> Products and services Supplied (please specify Govt/ Domestic market/ Export)	
24.	<b>Record of past performance</b> (e.g., Supply orders executed against of Ministry of Defence orders, Public Sectors and Paramilitary Forces, if any).	
25.	<b>Details of registration with</b> NSIC / SSI, DGS&D, other Defence Department, other Govt. Dept, membership of FICCI/ASSOCHAM/CII or other Industrial Association <b>(Attach relevant copies of registration letters)</b>	
26.	<b>Have you already taken any technology from DRDO</b> (If yes, give details attaching separate sheet)  Name of the Technology, Lab, Year, License number & Status	
27.	<b>ISO/ ISI certification or any other certification</b> (If yes, give details)	
28.	<b>Relevant clearances form the authorities/</b>	

	<b>ministries</b> (if any)	
29.	<b>Capacity and capability to undertake developmental work and to accept attendant financial and commercial risks.</b>	
30.	<b>Capacity/capability to market the product through the marketing network, sales and service network, reliability to maintain confidentiality.</b>	

## PART-2

### Infrastructure and other Information

1.	<b>Total area of factory</b> Covered (m <sup>2</sup> ), Uncovered (m <sup>2</sup> ), Bonded space available (m <sup>2</sup> )	
2.	<b>Ownership of factory</b> Self-owned, partnership, rental	
3.	<b>Electric power</b> Sanctioned Installed Standby (if any)	
4.	<b>Availability of adequate infrastructure</b> (List of machines and their production capacities) and technical expertise	
5.	<b>Name of bank &amp; A/c No Name of bank</b> A/c type A/c no Address of the bank Phone: Email:	

### 6. Details of current products:

S.No	Type	Description	Licensed/installed capacity	Annual production for preceding 3 years

### 7. Details of foreign collaboration, if any

S.No	Product	Name and address of collaborator	Year	Remarks

### 8. Details of products developed for services

S. No	Nomenclature of stores	Order No. and date	Remarks

### 9. Please give details of important facilities & infrastructure as per following format for:

- (a) Production
- (b) Unconventional, special m/c
- (c) Testing & quality control facilities

S.No	Description of m/c	Make & model	Qty	Date of purchase	Remarks

### 10. Furnish the following details with relevant certificates and documents

- (a) R&D facilities available

:

- (b) Inspection quality control of raw material components :
- (c) Assistance from central agency for testing / calibration etc. :
- (d) laboratory and drawing office facility :

**11. Principal customers:**

S. No	Name & address	S.O No and date	Date of last supply	Products supplied	Value

**12. Future plans (if any) in respect of expansion programme/ installation of additional machines/ test facilities etc.**

**13. Name of the technology requested for transfer**  
(give self-assessment of your capability to absorb the technology)

**14. Details of employee as on date on firm's pay roll**

<b>PERMANENT</b>				
Category	Post Held	Number	Qualification	Total Service
Technical	Prod. Manager Q.C. Manager Supervisor Testing Staff (QC) Skilled workers Unskilled workers, etc			
Administrative	Purchase Manager Accounts Officer Office Superintendent Clerical Others, etc			

<b>TEMPORARY</b>				
Category	Post Held	Number	Qualification	Total Service
Technical	Prod. Manager Q.C. Manager Supervisor Testing Staff (QC) Skilled workers Unskilled workers, etc			
Administrative	Purchase Manager Accounts Officer Office Superintendent Clerical Others, etc			

**DECLARATION:**

I / we confirm that the information furnished in Part 1 & 2 above is correct. In the event of any information given by me / us is found incorrect / false at any time, I / we understand our EoI for ToT will be cancelled/ rejected without notice, beside any other appropriate action against me / us.

Industry seal

Authorized signatory  
Name(s) in capital  
Designation and seal of authorized signatory

Date:  
Place:

**List of Support documents to be attached with EoI**

- (a) Memorandum and Articles of Association (Should be incorporated as per Indian Companies Act, as amended time to time)
- (b) Certificates of registration as a manufacturing unit, if any.
- (c) Audited Balance Sheet for the preceding three years.
- (d) Income Tax returns for the preceding three year period
- (e) Details of shareholding/ownership pattern especially foreign partners/ shareholders, foreign employees, directors, etc. The company must adhere to the prevailing Govt of India policies and regulations on Foreign Direct Investment (FDI)/DIPP norms as applicable.
- (f) Annual budget for R&D during last three years.
- (g) Numbers and details of IPR or patents, etc., held by the company.
- (h) Number of technically or professionally qualified personnel.
- (i) Record of past performance (e.g. Supply orders executed against of Ministry of Defence orders, Public Sectors and Paramilitary Forces, if any).
- (j) Availability of adequate infrastructure (List of machines and their production capacities) and technical expertise.
- (k) List of Testing and Support equipment's
- (l) ISO/ ISI certification or any other certification
- (m) Relevant clearances form the authorities/ ministries (if any)
- (n) Capacity and capability to undertake developmental work and to accept attendant financial and commercial risks.
- (o) Capacity/capability to market the product through the marketing network, sales and service network, reliability to maintain confidentiality.
- (p) PESO and DPIIT license for explosive handling if ToT is for high energy Material, explosives, propellants, and component/ system dealing with it etc.
- (q) Under taking form company seeking ToT that none of its Directors, Independent Directors, non-executive Directors, Key management personnel are involved in any corrupt practices, unfair means and illegal activities.
- (r) Details of the industrials license for defence manufacturing be provided by the industry seeking ToTs.
- (s) Application cum Industry Assessment Form.