PRE QUALIFICATION CRITERIA

1. The manufacturer / Supplier of Firefighting Robot should be ISO 9001 Certified company for design, manufacturing and after sales & service for Firefighting Robot. The certificates to be submitted with the offer.

2. Manufacturer / Supplier of Firefighting Robot shall have their sales & service network in India through their authorized agency / representative / distributor which shall have enough experience in robotic segment with full fledge manufacturing / fabricating / supplying the Firefighting Robot. To substantiate, Indian agent / representative / distributor shall furnish the authorization letter in original with tender documents.

3. The Firefighting Robot shall be supplied along with the vehicle. The vehicle to transport / stowage of the Firefighting Robot is also part of the specification and the amount mentioned in the tender shall be cumulative of the two for the consideration as L-1. They also have to give guaranty for supply of service and spare parts for minimum period of 10 years from the date of supply of the Firefighting Robot.

4. The Bidder may demonstrate Firefighting Robot, if required and demanded by Purchaser for technical evaluation before opening of the commercial bid at their own cost.

5. The Bidder shall have manufactured & supplied at least 1 no. Firefighting Robot to any Govt./ Semi Govt. organization in India during last 3 years. Bidder shall submit performance certificate from end user along with offer.

Note:

1. Wherever makes of any equipment is given it shall always be read in continuation word "or equivalent"
2. Wherever the numerical is used indicating dimensions of any equipment or material, tolerance of +/- 10% shall be accepted. Except for any safety parameter, unless mentioned in the tender.
3. Wherever the items / equipment is mentioned having NFPA or EN requirement, for all those equipment, proper certificate regarding the same shall be supplied by the OEM / Fabricator / supplier.

TECHNICAL SPECIFICATIONS FOR FIREFIGHTING ROBOT WITH CARRYING VEHICLE

0. SCOPE

This specifications lays down the requirements regarding material, design, construction, workmanship, finish and performance test of Firefighting Robot.

The pre-qualification mentioned in the first page of the specification shall be mandatory criteria.

The firefighting robot is not the substitute of the manpower requirement required in fire service but is assistance to the fireman and shall be used for firefighting in inaccessible areas where it might be dangerous for firemen to access in normal circumstances such as multilevel basements, chemical / petrochemical plants or incidents like terrorist attacks etc.

1.0 GENERAL REQUIRMENTS:

1.1 Firefighting robot shall consist of a track, water monitor, various cameras, thermal imaging camera drive system, remote controller, wireless transmitter etc.

1.2 The approx. dimensions of the Robot shall not be more than be 130 cm x 80 cm x 130 cm (+/- 10%) to fit in to the standard staircases and doors in residential and commercial buildings for the purpose of firefighting.

1.3 The Robot shall be splash waterproof including electrical system and shall be minimum IP 67 rated ingress protection.

1.4 The drive system of the robot shall be electric drive provided by hot swappable rechargeable lithium ion re-chargeable batteries.

1.5 The robot shall be able to perform in the ambient temperature range from - 50 to + 800° C and relative humidity up to 90%. The design of the robot shall be such that it shall perform in all weather conditions prevailing in any city.

1.6 Turning radius – On the spot rotation shall not be less than 360 degrees.

1.7 The robot should be able to climb standard staircase, slopes and enter into standard door frame size.

1.8 The robot shall be supplied along with IP67 ingress protection certificate, UN 38.3 certificate for lithium ion batteries, EN certificate for water monitor, relevant CE or machinery directive certificates for firefighting robots and relevant confirmation for ambient temperature resistance of the firefighting robot.

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2.0 ROBOT CHASSIS

2.1 The robot chassis shall have good dynamic performance, load capacity.

2.2 The robot body shall be built from special Aviation Grade Aluminium such as 7075 T6 grade material or equivalent for highly stressed used, high strength, high reliability and corrosion resistant.

2.3 The Robot shall have integrated strong frame, full drive design and shall have ability to adapt the ground.

2.4 The robot shall have ability to work in marshy land, grass, potholes, continuous hump, gravel, and another road, easy and flexible walk, and shall meet firefighting requirement of rapidly changing fire ground environment.

2.5 The robot shall carry certain operating modules and shall drag the full range of long charged fire hoses without having the reverse effect of jet reaction.

2.6 The robot shall have inbuilt electromagnetic brakes which will enable the robot to stop midway on the staircase or any slope during operation for safety purpose.

2.7 The electromagnetic breaks shall engage automatically when controls are released.

2.8 The robot can carry the load up to 250 kg and pulling capacity of up to 5 tons.

2.9 The Robot can climb positive or negative slope up to 40° and cross obstacle of minimum 30 cm.

2.10 The robot shall be equipped with all terrain rubber track with metal core, water monitor, HD cameras and Thermal Imaging Cameras.

2.11 The robot shall climb the stair and cross the ditch.

2.12 The ground clearance shall not be less than 25 cm and it shall cross slope and side slop of minimum 35°.

2.13 The speed of robot shall be not be less than 5 KMPH on normal road surface.

2.14 Work light: LED type, work lights on the front face with other work lights installed laterally. The luminous intensity of light shall not be less than 3500 lumens.

2.15 Robot shall be equipped with water curtain self-protection device – with manual mist protection system.

2.16 The Robot shall have pulling capacity of minimum 5 tons and necessary towing hook with guide roller system shall be provided.

2.17 The ambient temperature resistance of the robot shall be at least 800° Celsius to ensure seamless working in hot environment particularly in confined spaces and basements.

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2.18 The robot shall have a registered jack (RJ45 jack) which shall enable the user to use the robot with RJ45 cable (wired connection) for all movements, water monitor movement, controlling lights, siren etc. for long and sustained operations.

2.19 The RJ45 jack shall also enable the user to diagnose the robot remotely.

2.20 The robot shall have an optional feature of changeable modules which can be changed within short time without the need of any tools or tackles for future modifications.

3.0 WATER MONITOR

3.1 A remote controlled water monitor: Akron Brass/Elkart/AWG/TFT or equivalent make having min. 1000 LPM to 2000 LPM @ 7 to 10 bar pressure and throw range of approx. 60 m shall be provided and fixed on the top of the Robot.

3.2 The robot shall have a 63 mm male instantaneous BIS water inlet couplings to connect fire hoses.

4.0 POWER SYSTEM

4.1 The robot shall be powered by multiple hot swappable lithium-ion rechargeable batteries (at least 2) for tactical reasons and shall be driven by minimum 2 powerful Brushless Direct Current (BLDC) motors.

4.2 The Batteries shall be Hot Swappable Lithium Ion rechargeable batteries having suitable capacity to sustained the minimum run time stipulated herein with additional 20% capacity.

4.3 The batteries shall be in multiple numbers (At least 2) with hot swapping type for uninterrupted and continuous firefighting operation.

4.4 Battery should be UN 38.3 certified from international testing laboratory. The battery weight should not be more than 10 kgs each. Light weight will enable the firefighter to replace the batteries easily and quickly for continuous and non-stop operation.

4.5 In case the battery is discharge or failure, the robot shall be able to work on the other set of batteries without stopping in the middle of firefighting operation.

4.6 The battery swapping shall be without requiring any tools, tackles or extension cables/wires. Additional power bank or trolley type battery pack is not allowed for tactical reason.

4.7 The hot swapping technology should not dilute the IP67 ingress protection rating of the robot. The IP67 protection of the robot should be retained at all time.

4.8 The working duration of the Robot shall be Min 5-7 hours on single charge and continuous and uninterrupted prolonged operation with hot swappable battery technology.

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5.0 CAMERAS

5.1 The robot shall be equipped with high definition video camera in the front and rear and a thermal imaging camera. The position of front camera shall be in the upper middle side of the chassis which will enable the user to drive the robot remotely while looking into the remote control for use in underground basements, confined areas, areas with low visibility and also places where it is dangerous for fire fighters to enter.

5.2 The live feedback from all camera shall be transmitted to wireless remote controller in real time. The remote controller shall be able to record videos and take screenshots for future reference and training purpose.

6.0 REMOTE CONTROL

6.1 Remote controller of IP65 rated having frequency transmitter with integrated LCD display for video feedback.

6.2 The Robot shall be operated by handheld tablet type remote control by means of a radio controller with a control distance of at least 500 meters.

6.3 The remote control shall also have hot swappable batteries, min 10.0 inch LCD display, video recording feature, screenshot feature, split screen feature, battery level indicators for remote and robot, slope information, temperature information along with all forward, backward, left and right controls of robot and water monitor. This will help operator for tactical manoeuvrability of Robot under zero visibility condition and better control when Robot is used out of sight condition.

6.4 The remote control shall have a combination of joysticks, button and touch screen which can be operated with fireman gloves for ease of operation on all scenarios.

6.5 The remote controller should be operated on hot swappable lithium ion rechargeable batteries (at least 2 nos.). A spare set of batteries and external charging dock shall be provided for continuous charging.

6.6 The remote controller shall be light weight with shoulder strap. The remote controller shall be stored in sturdy suitcase while transportation.

6.7 The robot shall be controlled and operated by remote control by means of Radio Frequency allowed free by Department of Telecommunication, Govt. of India.

7.0 CARRYING VEHICLE SPECIFICATIONS:

7.1 The vehicle used for carrying the robot shall be light duty vehicle, right hand drive with cabin having about 1.5-ton payload capacity and shall be of reputed make such as Tata or Mahindra or equivalent.

7.2 The vehicle shall have approx. wheel base of 3000 mm

7.3 The engine shall be Four cylinder, four stroke, water cooled, diesel engine complying BS VI emission norms in force.

7.4 The engine shall develop min. 75 HP and min. torque of 175 Nm.

7.5 Gear Box- 5 speed synchromesh.

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7.6 Clutch – Single plate dry friction type.
7.7 Steering – Power assisted hydraulic.
7.8 Brakes- Disc/Drum hydraulic brakes.
7.9 Suspension – Front – Leaf spring of strut type Rear – Semi elliptical leaf spring.
7.10 Wheels and Tyres – Suitable size as per load on axle with spare tyre.
7.11 Fuel Tank – Min. 45 ltrs.
7.12 Cabin – Fully furnished, single cabin having 1 + 2 seating capacity.
7.13 Rear Load body – As per manufacturer's design and dimensions.
7.14 Body Fabrication – Fully enclosed rear body to store Robot shall be provided and fabricated over the original load body (Tray) supplied by chassis manufacturer. The structure shall be made from square tube suitable size and the panelling shall be 16 SWG aluminium sheet from outside and 18 SWG from inside. The flooring shall be covered with 10 SWG aluminium chequered plate properly fitted to the flooring.
7.15 Full size tail gate shall be provided which will work as door cum platform slope to load and unload the Robot in the vehicle.
7.16 The hydraulic system shall be electro hydraulically or PTO operated. Necessary locking system shall be provided to tail gate. Proper arrangement shall be provided to lock the Robot inside the vehicle preferably with soft lockable slings.
7.17 Complete vehicle shall be painted with two finished coat of Red colour RAL 3000 shade PU paint after necessary surface preparation and primer coat. The inside of the vehicle shall be painted with Royal Ivory synthetic enamel paint.
7.18 Names and logo of the dept. shall be provided as per local fire brigade design.
7.19 The vehicle shall be provided and fitted LED type Red/White/Blue sequential light on the roof with controlling switch inside the cabin. The light shall be of reputed make.

8.0 DOCUMENTS :

8.1 Following Documents has to be submitted during the bidding process and after the delivery such as :

General layout of the robot layout.

EN / CE Certificate as per applicability from third party (self-certification not permissible)

Flow diagram Electrical system Locker drawings of vehicle carrying Robot

8.2 User Manual and Instruction Booklet- Instruction books for the guidance of the user including both operation and normal maintenance shall be supplied for all the equipment in English language. The books shall include an item wise and illustrated spare parts list giving reference numbers of all the possibly wearing parts. The workshop manual and spare parts catalogue of chassis shall also be supplied with vehicle preferably with soft copy.

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9.0 STAGEWISE INSPECTION.

9.1 Each stage wise inspection will be carried out by representative from the ULB (Purchaser) or any authorized person by Purchaser. It is hereby suggested that there should be minimum three member panel in the inspection team.

9.2 Expenses towards lodging boarding of inspecting team members should be born by the Company. To and fro expenses towards the travelling of the team members from the journey place to the works will be borne by the successful tenderer and the offer shall contain all such expenses.

9.3 Advance notice of at least 1 week should be given by the vendor; however the vendor must keep the firefighting Robot ready for stage wise inspection before giving such notice to Purchaser

10.0 TRAINING

10.1 The successful tenderer has to arrange training for the personnel of ULB"s Fire Service in handling, operation and maintenance of the Robot as mentioned in the specification. The training of minimum 1 session of 1 day at ULB"s fire station shall be conducted. The training shall cover operation, handling and maintenance of fire fighting robot. If required, the same training shall be conducted after three months.

10.2 All the expenses towards the training shall be included in the cost in addition to training material and the cost of tools and equipment and consumable required at the time of training.