

**DEEPRobotics**  
云深处科技

Dedicated to the ultimate combination  
of locomotion and intelligence to build a bright robotic future



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# X20

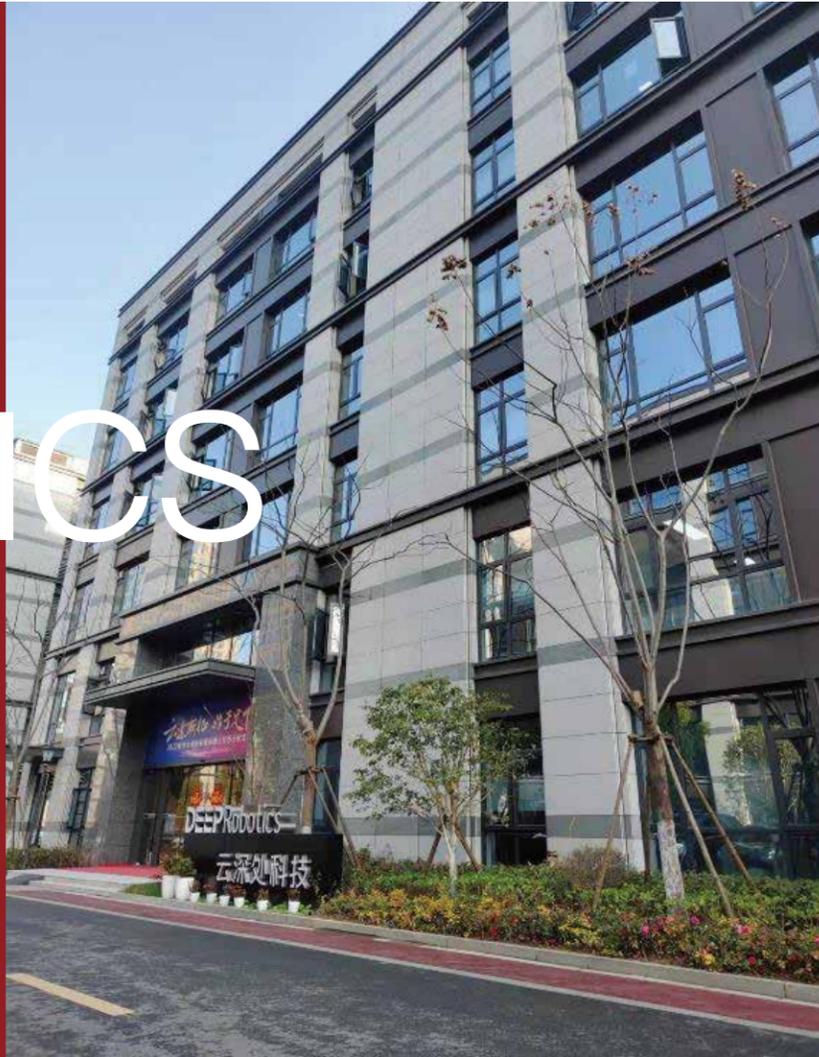
**Hazard Detection & Rescue Solution**

Fearlessly Conquer Crisis Like A Shadow By Your Side

# COMPANY PROFILE

# DEEP ROBOTICS

Leading the Industrial Application Quadruped Robot in Asia



Founded in Nov 2017, the National New Hi-tech enterprise

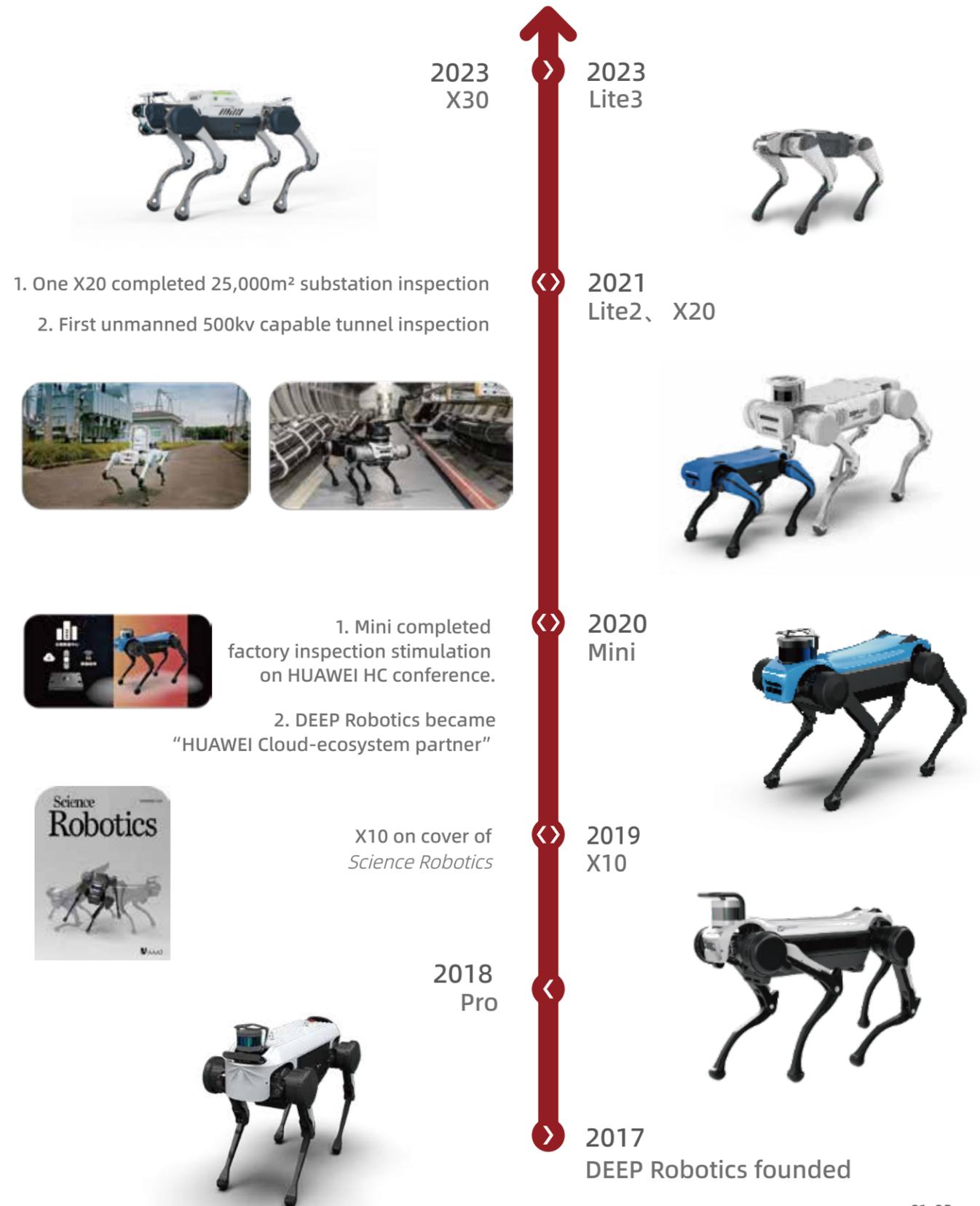
The first domestic quadruped robot with autonomous navigation and intelligent interaction (Pro 2018)

The first domestic quadruped robot with IP66 industrial grade protection (X20 2021)

The first to participate in National earthquake relief drill "Emergency mission · 2022" (x20 2022)

The first to realize autonomous robot dog fleet coordinated unknown environment exploration (X20 2022)

## Milestone



# COMPANY PROFILE

## Press

Cover of the global authoritative journal *Science Robotics*



## Partners & Clients

Top-ranking institutes, companies, and universities



## Core Team

<p><b>Li Chao</b> Co-Founder CTO</p> <p>Zhejiang University Ph.D.</p> <p>The first youth award winner of 2050 conference in 2018</p> <p>Huawei Global Ascend Expert (2020)</p> <p>Hangzhou E-class talent</p>	<p><b>Zhu Qiuguo</b> Founder CEO</p> <p>Zhejiang University Ph.D.</p> <p>Executive Chairman of the 28th IDC Robocon</p> <p>Owns more than 30 authorized invention patents</p> <p>Authorized 2 US invention patents</p>	<p><b>Chu Jian</b> Strategic Advisor</p> <p>Researcher of Control Science and Engineering, Zhejiang University</p> <p>Founder of Supcon Technology Group</p> <p>Expert in Industrial Automation</p>	<p><b>Ge Liezhong</b> Strategic Advisor</p> <p>Professor of Psychological Science Research Center, Zhejiang University</p> <p>Chinese Psychology Association</p> <p>Chairman of Engineering</p>

Staffs are mainly PhDs and Masters from Zhejiang University, Harbin Institute of Technology, The University of Michigan, Georgia Institute of Technology, and other well-known universities. The R&D member ratio of the team is more than 60%

(NO PARTICULAR RANKING ORDER)

# CHALLENGES

## Unique Advantages of the Quadruped Robot

### Phenomenon



Manual Detection



Traditional robot Detection

#### Operation Risks

Certain levels of leaking gases, carbon dioxide, hydrogen chloride, etc., and falling objects, electric shock may cause injuries to the human body.

#### Insufficient Info

Post-disaster scenes often contain excessive levels of smoke, that extreme condition may cause limited vision, in which rescuers and the command center will receive insufficient information.

#### Adaptability Limits

With the weak adaptability to complex terrains such as debris, rubble piles, and steps that traditional robots are difficult to cross over large obstacles to get into the core area.

#### Weak Agility

Traditional robots are difficult to make turns on complex terrains, it also has low speed, low flexibility, and greater chances to step on stranded victims or cause damage to the original environment.

	Wheel	Track	Quadruped
Ruins & Rubble Piles	×	×	✓
High Degree Stair	×	×	✓
Agility	Limited	Limited	Flexible (Rotate, Side Walk)
Ground Contact Area	Large	Large	Small
Indoor to Outdoor	×	×	✓
Self-Right	×	×	✓

# DETECTION SOLUTION

## Modules (Customizable)

#### Bi-Spectrum PTZ Camera

25x zoom in and detect tiny objects from distance, track heat source through dense smoke to gather temperature data.

#### Dynamic Infrared Camera (optional)

With a 4 million pixel high-definition camera, clear video can be obtained in high-brightness environments under strong light sources, low-light environments such as backlight shadows, and real-time image transmission presents on-site images of different scenes.

#### Mesh Network

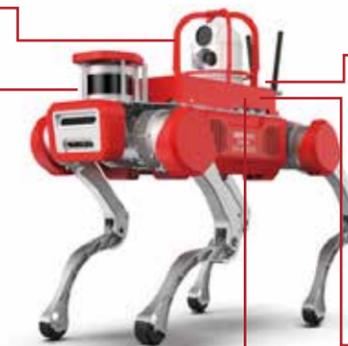
Build a communication link between the base station and the quadruped robot, able to remote control within 1km, control signals, data, and image transmission signals within a line-of-sight distance of 30km, support relay to further extend the signal coverage to three-dimensional environments such as underground garages and high-rise buildings.

#### Sound Pickup

Receive sounds and build connections to make rescue call with victims.

#### Gas Sensor

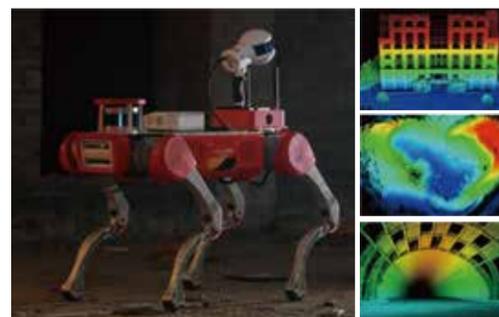
Automatically identify and detect combustible harmful gases such as carbon monoxide, carbon dioxide, oxygen, combustible gas, nitrogen oxides, hydrogen sulfide, etc., and provide real-time concentration alarms.



## Other modules (Optional)

#### All-terrain Modeling System

It can capture true color data quickly in large environment with LiDAR and SLAM algorithm, it supports multi-platform and multi-mode operations, and achieve integrated measurement of multiple indoor scenes. With the LiFuser-BP point cloud processing software, the point cloud data can be quickly post-processed to restore and record the true situation on site



#### Light-weight robotic arm

It is able to grab objects remotely, picked up objects, and switch valves with Add-ons of camera and claw.



#### Industrial controller

Wireless digital image transmission, dual-channel full HD video real-time display, network port access to communication links, achieving remote control, data, and image link 3-in-1.



# X20

## Hazard Detection & Rescue Solution

Weight 55kg

Standing Size 1000\*450\*800(mm)

COMM Range Remote 1km, LOS 3km

Ingress Protection IP66

Max. Speed 15km/h

Surmounting Abilities Climb unstructured ruins, debris & rocks, 20cm Steps. Slope >30°

Endurance 2-4h

Max. load 85kg

### All-Terrain

Able to cross over 20 cm high obstacles and stairs, 30° slopes, and move freely on unstructured surfaces such as debris, rubble piles, gravel, and grass. Omnidirectional, flexible, and light contact to the surface to avoid changing the environment; lower the chance of secondary accidents.

### All-Weather

IP66 protection, in the dense smoke, toxic gas, rains, frigid temperature, hail, and other extreme conditions to complete rescue tasks.

### Assistance

Able to do heavy-loaded tasks, carry supplies into the disaster area to assist the rescue mission.

### Smart Detection

Omnidirectional imaging & thermal display, sense harmful gases, scan pathways, etc.

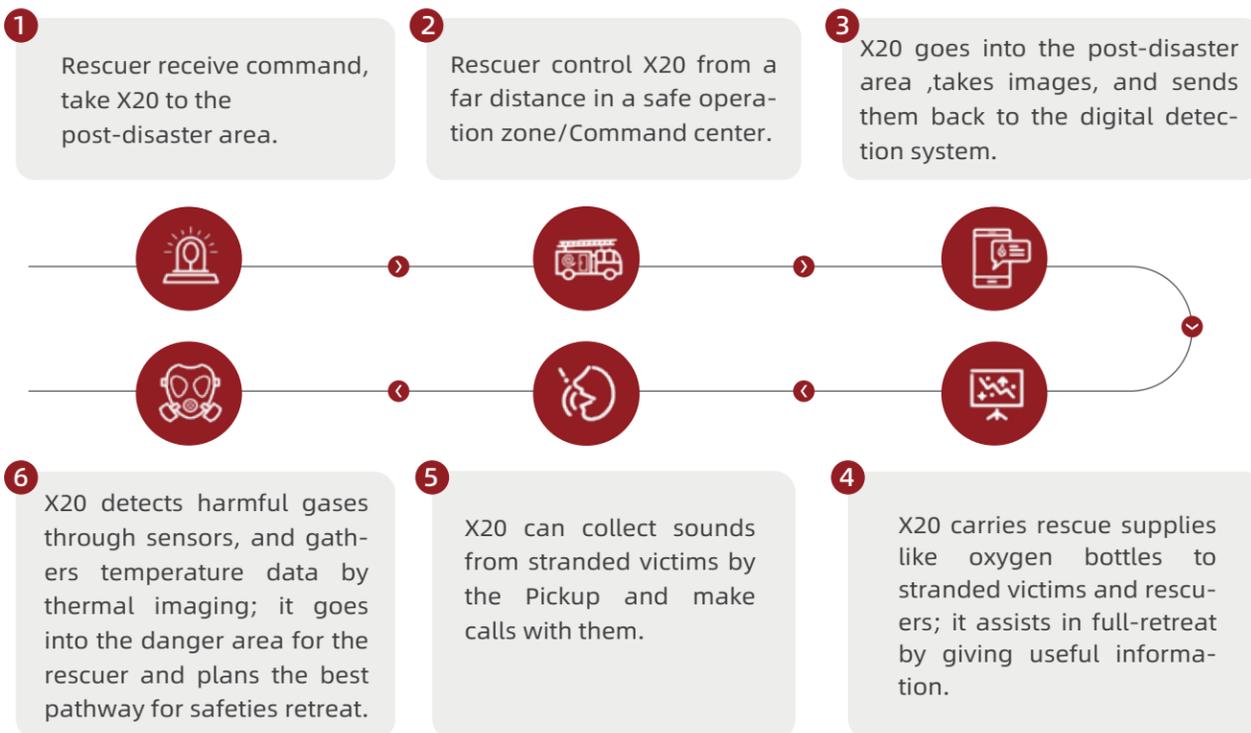
### 3D Stimulation

Long-range image transmission, full-scene scanning, build cloud maps to display the real-time environment, providing accurate visual information for correct rescue decisions.



## Efficient Indoor & Outdoor Rescue Mission

### Detection & Rescue Work Flow



It goes into extreme environments such as toxic, hypoxia, collapsed buildings to operate detection, rescue, supplies transition, also it helps to reduce the occurrence of secondary



It can trot on unstructured surface and goes into complex environments that drones and traditional robots can't go.



It can complete both indoor and outdoor rescue mission; also work under extreme condition like downpour, dust storm, frigid temperature and hail



It provides accurate information of real-time images from all directions, thermal images, and data of harmful gases to the smart digital system, it able to zoom in on tiny objects in 30x, and build 3D map of the original environment.

**X20**  
Hazard  
Detection  
Robot

- FIRST QUADRUPED ROBOT
- IN NATIONAL EARTHQUAKE DRILL



### “Emergency Mission·2022” Drill

X20 has participated in a national earthquake relief drill in Gansu province, one of the Jueying equipped a **Mesh network** and a **Bi-spectrum camera**, to detect heat source, intensity of radiation, obstacle’s situation, and assist rescuers to search for stranded victims; the other one was installed a **gas sensor** to detect harmful gases and provide data to the digital operating system. The Jueyings have successfully completed the mission with outstanding performance.

### Highway Tunnel Traffic Accident Drill

Shaanxi Transportation Holding Group Co., Ltd. Baiquan company organized an emergency drill for sudden traffic accidents in highway tunnels. This drill used the ‘X20 quadruped robot’ for the first time. In toxic, hypoxic or dense smoke environments, it went to the drill site to conduct preliminary investigations of uncertain factors at the accident site, automatically identified thousands of harmful gases and real-time concentrations, and improved the safety of emergency response to sudden incidents.

