

DEEP Robotics

云深处科技

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

DEEP Robotics



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Due to product updates, contents may change. Please consult for final confirmation

V0024005

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Quadruped Robot Hazard Rescue Solution



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APPLICATION TRENDS

Digital and Intelligent Transformation is Accelerating

During the China’s “Two Sessions,” “AI+” was written in the government work report for the first time:

It proposed to deepen the research and application of big data and artificial intelligence, launch the “AI+” initiative, and create internationally competitive digital industry clusters.

“Robotics +”

It is issued by the Ministry of Industry and Information Technology (MIIT), the Ministry of Emergency Management (MEM), and other departments to accelerate the expansion of robotics applications and their integration into emergency management and rescue operations. This initiative aims to boost the efficiency, safety, and intelligence of emergency response efforts. Advanced robotics within the emergency management framework enables swift and effective responses to diverse incidents, including natural disasters, accidents, public health crises, and social security emergencies.

MIIT and MEM issue:

“Guiding Opinions on Accelerating the Development of Emergency Robotics”

The development and application of emergency robots represent the modernization trend of emergency management equipment, serving as a crucial indicator of the modernization of China’s emergency management system and capabilities. By aiming to develop advanced emergency robots by 2025, significant improvements in the levels of scientific, professional, refined, and intelligent capabilities are anticipated.

Phenomenon



Manual Detection

● **High risk of operational safety:**

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

● **Insufficient information collection:**

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.



Traditional Robot Detection

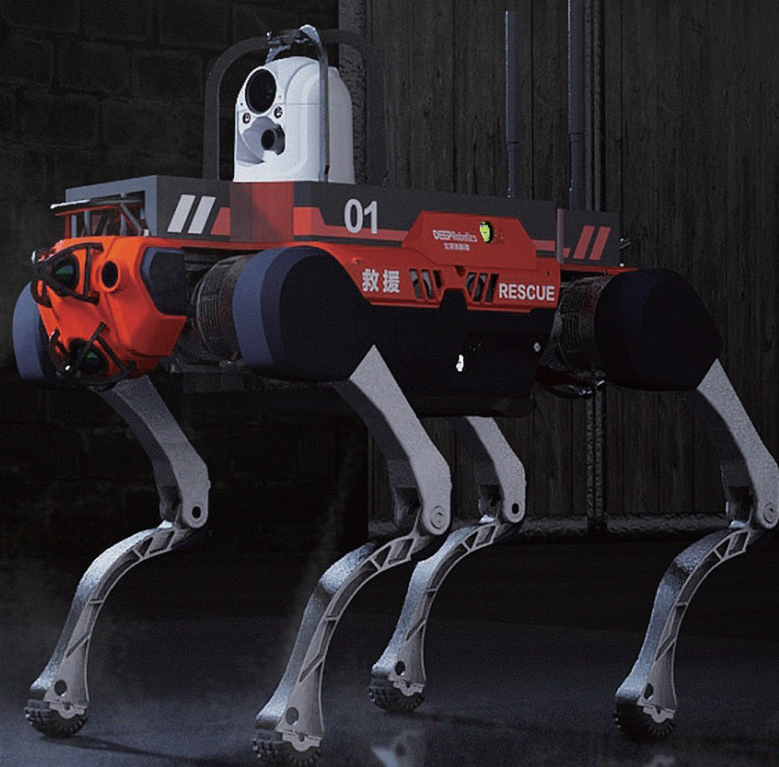
● **Limited adaptability:**

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.

● **Inadequate flexibility:**

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.






Advantages of Quadruped Robot

- Digital Intelligence** Real-time upload of rescue scene data to the system.
- All-terrain** It can trot on unstructured surface. The flexible movement with a small contact area avoids changing the scene environment, reducing the probability of secondary accidents.
- All-weather** IP67 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 rescue trapped people.
- Smart Detection** Omnidirectional imaging & thermal display, sense harmful gases, 3D terrain, 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.
- Safety** Replace rescue personnel in entering high-risk scenes to reduce the probability of secondary accidents and protect rescuers' lives.

Conventional Robots VS Quadruped Robots



	Wheel	Track	Quadruped
Stair	✗	✗	✓
Gravel Road	✗	✓	✓
Grassland	✗	✓	✓
Agility	Limited	Limited	Flexible
Indoor to Outdoor	✗	✗	✓
Self-Right	✗	✗	✓
Ground Contact Area	Large	Large	Small

X30

Hazard Detection & Rescue Solution

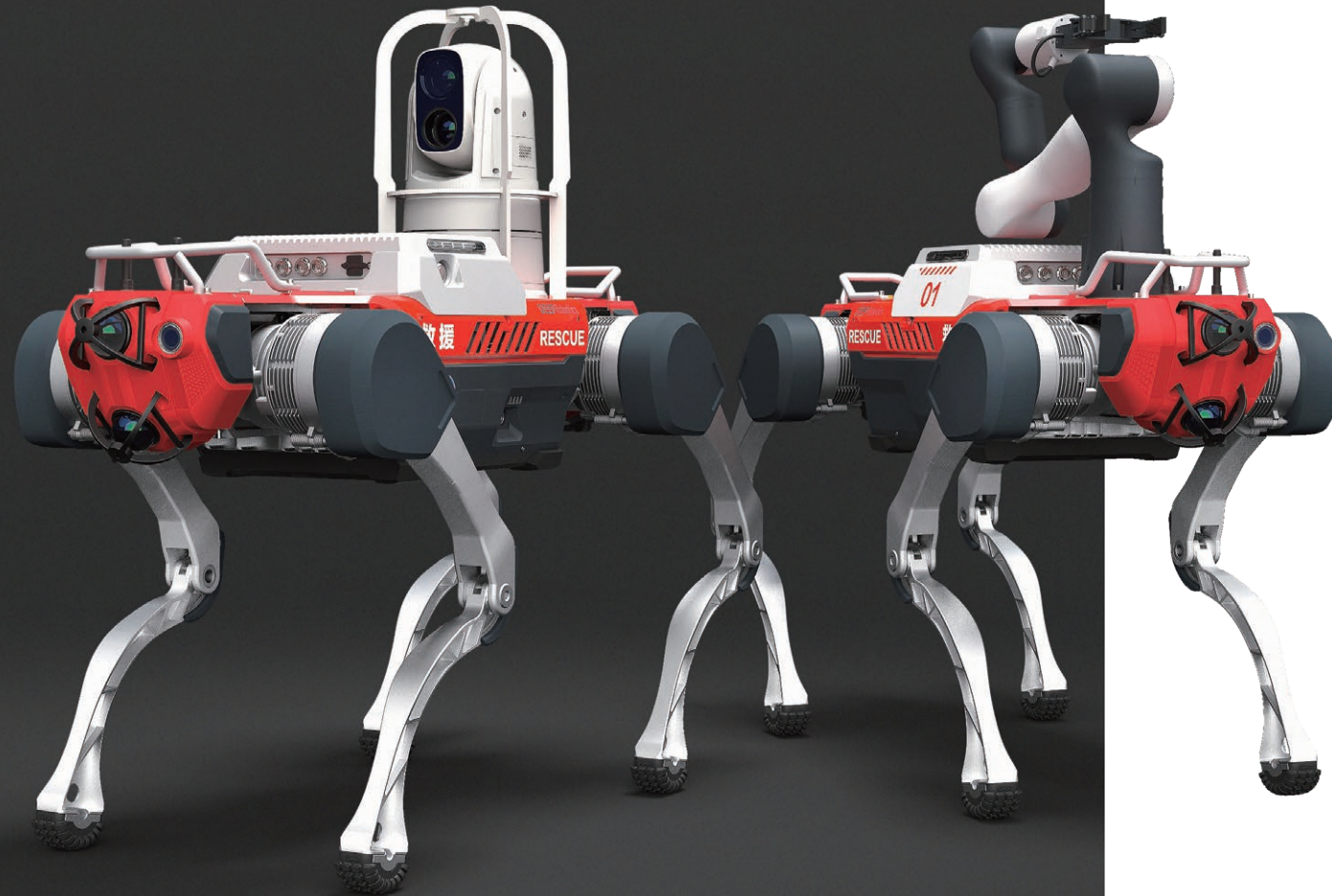
Parameter

Weight:	56kg	Stand-up Size:	1000*470*585 (mm)
Max. Speed:	≥4m/s	Work Duration:	2.5 - 4h
Ingress Protection:	IP67	Mileage:	≥10km
Slope:	≤45°	Temperature:	-20°~55°C
Load:	≥20kg	Step/Obstacle' s H:	≥20cm
Interface:	Ethernet Output Power Supply (72V BAT)		

Function (Different models, different functions)

- | | |
|---|--|
| 01. Stair Climbing Perception | 02. Obstacle Stop |
| 03. Multi-sensor Fusion Mapping Algorithm | 04. Auto-charging |
| 05. Industrial-level Navigation Interface | 06. Navigation Planning Algorithm |
| 07. Multi-sensor Fusion Localization Algorithm | 08. Built-in RTK Module |
| 09. Smart Light Interaction Interface | 10. Fusion Calibration Algorithm |





More Function Modules Available

Communication Location

- ▶ 4G/5G
- ▶ GPS/RTK
- ▶ More...
- Long Range
- In & Outdoor Locating Assit
- Others

Sensation

- ▶ Pi-spectrum Cam ▶ Humidity Sensor
- ▶ Gas Sensor ▶ Pick-up
- ▶ More...
- Gas Concentration Detection
- Other Abnormal Recognitions
- Voice Recognitions
- More...

Operation

- ▶ Robot Arm ▶ Telescopic Parts
- ▶ Storage Parts ▶ More...
- Load Transportation
- Difficult-angle Penetration
- Switch Operation
- Other Actuation Operations

Collaboration

- ▶ Door/Ladder Control
- ▶ More...
- Collaborative Command Needs for Different Scenarios
- Communication



Mesh Network

Build a communication link between the base station and the quadruped robot, 1km remote control, 3km line-of-sight distance for control signal, data, and image signal transmission, support relay to further extend, signal coverage in underground garage and high-rise building and other 3D environment.



Intelligent Controller

The navigation host motherboard simultaneously handles business-related program processing, primarily providing functions such as map construction and location navigation. Equipped with multiple communication interfaces.

Parameter:

- External Power Supply Interface: 12V 24V
- External Communication Interface: Ethernet; USB2.0; USB3.0



Bi-Spectrum PTZ Camera

Visible light 25x zoom to detect tiny targets in the distance, thermal imager penetrates smoke and obstruction to track heat sources and obtain personnel and environmental temperature distributions.



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.



All Terrain 3D Laser Scanner

It can capture true color data quickly in large environment with LiDAR and SLAM algorithm, the point cloud data can be quickly post-processed to restore and record the true situation on site.

- Point Cloud Accuracy: 6mm @ 10m/8mm @ 20m
- Ranging Accuracy: 4mm @ 10m/7mm @ 20m

Other Modules (Optional)

Light-weight Robotic Arm

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

Wide Dynamic Infrared Camera

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

Gas Sensor

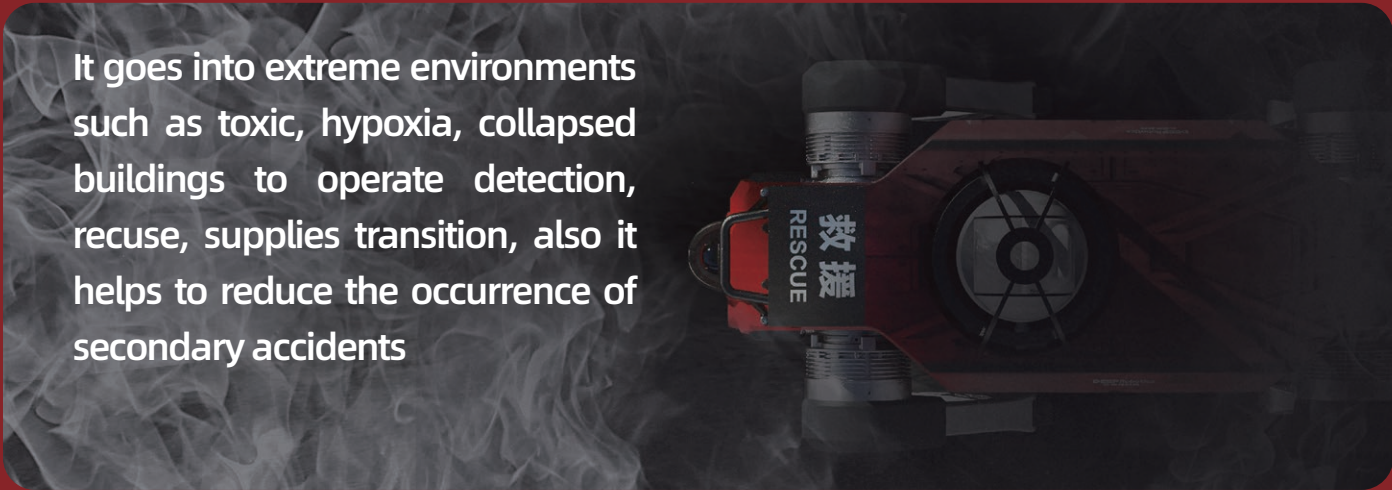
Automatically identify and detect combustible harmful gases such as carbon monoxide, carbon dioxide, oxygen, nitrogen oxides, hydrogen sulfide, etc., and provide real-time concentration alarms.

Sound Pick-up

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

SMART HAZARD RESCUE SOLUTION

Efficient Indoor & Outdoor Rescue Mission



WORK FLOW



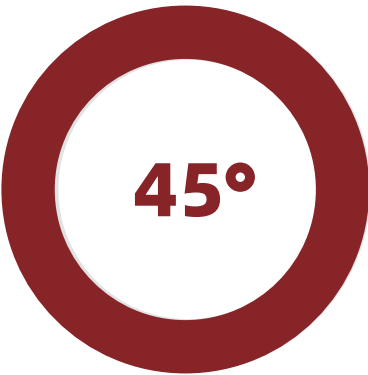
1. Rescuer receives command, takes X30 to the post-disaster area.
2. Rescuer controls X30 from a far distance in a safe operation zone/command center.
3. Operator makes orders to X30, it goes into the post-disaster area to take images, and sends them back to the digital detection system.
4. X30 detects harmful gases through sensors, and gathers temperature data by thermal imaging; it goes into the danger area for the rescuer and plans the best pathway for safety retreat.
5. X30 can collect sounds from stranded victims by the Pickup and make calls with them.
6. X30 carries rescue supplies like oxygen bottles to stranded victims and rescuers; it assists in full-retreat by giving useful information.

INTELLIGENT HAZARD RESCUE PLATFORM

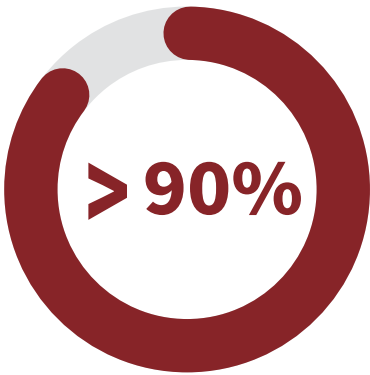
QUADRUPEL ROBOT
HAZARD RESCUE SYSTEM



-20℃ ~ 55℃
High Degree of
Ingress Protection

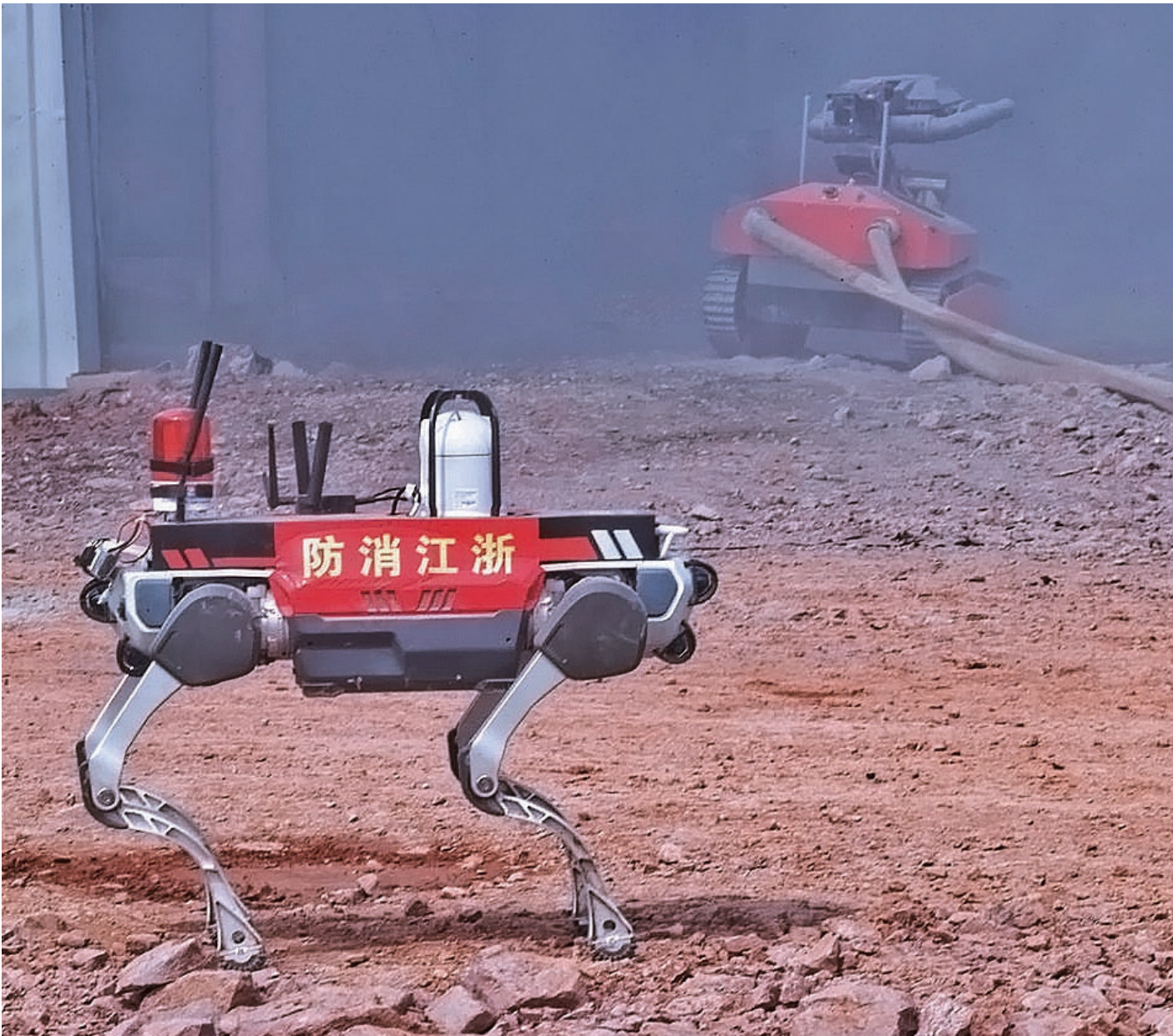


Maximum Climbing
Slope 45°



All-terrain Coverage
Inspection

APPLICATION CASES



"Emergency Mission 2024" Super Typhoon Prevention and Catastrophic Flood Disaster Joint Rescue Drill:

X30 participated in the “Emergency Mission · 2024” rescue drill, organized jointly by the State Flood Control and Drought Relief Headquarters, the Ministry of Emergency Management, and the Zhejiang Provincial Government in Zhejiang Province. In this drill, a certain fire brigade and DeepRobotics jointly provided the “Quadruped Robot Hazard Rescue Solution”. The robot dog and the drone collaborated to complete the detection of the sudden flammable and explosive chemical hazard. Through the dual-light gimbal and gas detector carried, it detects the temperature of the fire field, the intensity of radiant heat, toxic and harmful gases, and the situation of obstacles, providing valuable information for the rescue personnel and successfully completing the drill tasks.

Fearless in the face of danger,
Overcoming obstacles,
Assisting in disaster relief.



2022 Earthquake Relief Drill

X20 has participated in a national earthquake relief drill in Gansu province, one of the X20 is equipped with a Mesh network and a Bi-spectrum camera, to detect heat sources, intensity of radiation, obstacles, 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 X20 has completed the mission with outstanding performance.



Tunnel Traffic Accident Drill

Shanxi 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.



High-speed Firefighting & Rescue

Zhejiang Communications Investment Group Co.,Ltd adopted X20-Hazard detection robot, which combines various firefighting function modules,to perform unmanned reconnaissance, detect and rescue.



Inner Mongolia Drill

Ordos, Inner Mongolia, conducted an emergency drill for a gas pipeline leak explosion. Drones, robots, and robot dogs were deployed for detection, firefighting, and other tasks to explore unmanned modes of operation and enhance the scientific and technological level of unmanned rescue. In real-life emergency situations, the X20 can improve rescue efficiency by replacing firefighters in hazardous environments.

For More Infomation, Please Call 400-0559-095