

CBRN Patrol



Robotic CBRN Monitoring Vehicle

Unmanned CBRN monitoring & reconnaissance

Features

- Air sampler
- UV-based bioaerosol detector
- Portable weather station
- Visual and PTZ thermal IR cameras
- GPS
- Vehicle handles rough terrain easily
- Control software for vehicle, camera, and sensor suite

Application Areas

- Counter-terrorism monitoring
- Military
- Public Safety
- Environmental Monitoring

CBRN Patrol™ is an integrated, multi-featured, remote-controlled, wheeled robotic monitoring vehicle suitable for a wide range of counter-terrorism monitoring applications. It allows the operator to test for biological contamination from a safe distance.

An on-board PTZ camera sends real-time images to the tablet display, allowing the operator to drive CBRN Patrol beyond visual range. The camera display can be quickly and easily converted to IR thermal mode when required.

The biodetector rapidly detects sudden changes in airborne bacteria, viruses, spores, or proteins. The operator is notified immediately, and the air sampler automatically collects particulates for later analysis.

The air sampler employs single-use electret filters to automatically collect aerosol samples following an alarm. The filters are extremely effective at collecting

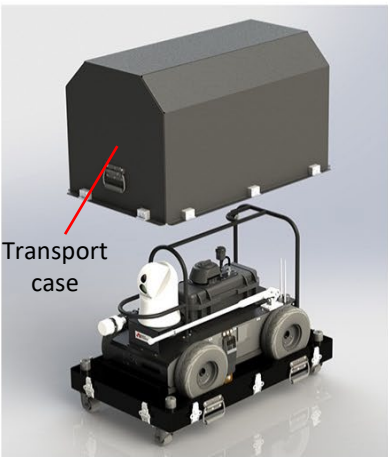
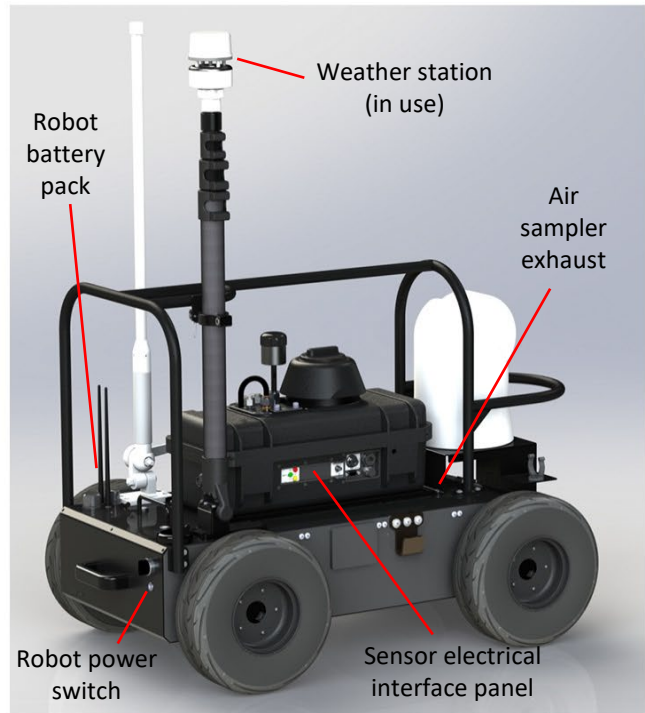
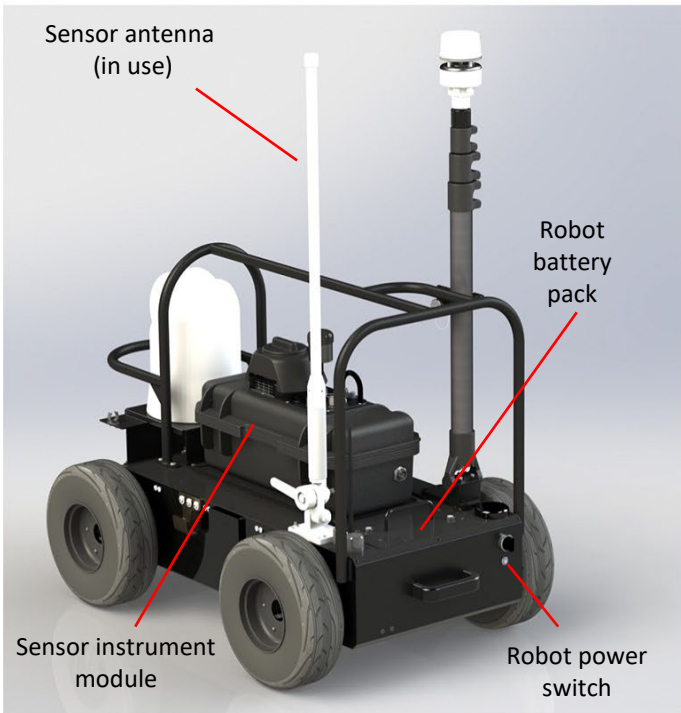
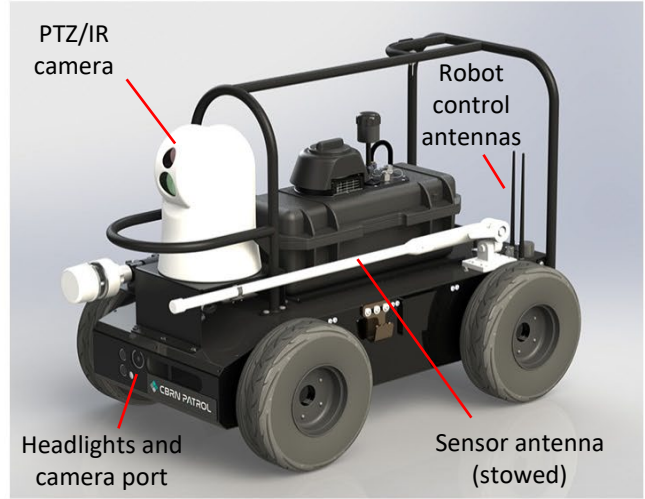
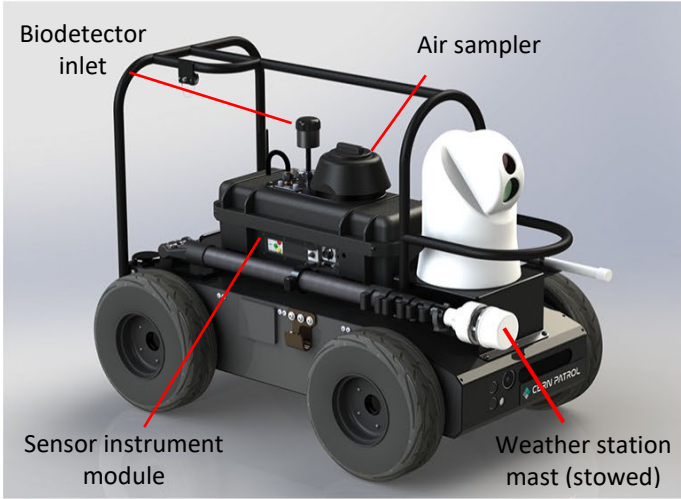


aerosols within the respirable range of 1 to 10 microns.

A weather station measures and stores wind speed and angle, air temperature, and barometric pressure at the specific GPS location.

Controls for the robot, camera, and sensor suite are contained in two separate water-tight cases for easy use on location. All collected data is stored in the industrial-grade computer within the CBRN Patrol. Data can be wirelessly transmitted over a 1 kilometer range from the robot to the sensor control software.

The vehicle can handle rough terrain, wet or dry, including sand, rock concrete, gravel, grass, and soil. It also climbs steep angles and negotiates most curbs and steps.



Wheeled Robot Specifications

Terrain	Sand, rock, concrete, gravel, grass, soil, and others wet and dry. Slope: > 45°
Maximum vertical step	155mm (6")
Stair climbing	Max stair step height 110mm (4.5") Traverse: > 200mm (8")
Speed	0 – 11km/hr
Turning radius	min 750mm (29.5") diameter of turning space
Night time operation	Headlight equipped
Ground clearance	88mm (3.5")
Operator remote control	Wireless gamepad
Autonomous navigation	With GPS and 9 DOF IMU (Gyro/Accelerometer/Compass)
Motors	24V, 80W x 4 output; 100kg-cm/wheel, 2.75A nominal, 16A peak
Payload	30kg onboard, 50 kg dragging
Video/audio	Color camera (640x480, 30fps) with audio
Operating temp. range	-30°C to +50°C
Shock resistance	Drop to concrete: Max: 1200mm (4ft) Rated: 900mm (3ft)
Movement control	5 Hz GPS, gyro/accelerometer/compass, 9 DOF IMU
Communication	Wi-Fi 802.11G
System monitoring	Battery level and motor temperature
Power	LiPo 22.2V, 2ea x10AH modules, 4 hours continuous operation
Dimensions	265H x 573W x 615L (mm) 10.5H x 22.5W x 24L (inches)

Biodetector Specifications

Operating principle	Monitoring of 280nm UV-stimulated particle scattering and bio-fluorescence using photon counting electro-optics.
Particle size and type	<1 to 15 microns in four size ranges. Responds to aerosolized bacteria, spores, viruses, and toxins
Interferents	Interferent resistant to diesel smoke, pollen, silica dust
Detection limit	Less than 30 ACPLA at 90% confidence limit
Sampling rate	1.2 liter per min of ambient air nominal
Data output	Alarm, particles per liter of air in each size bin; percentage of particles that are biological; normalized particle bio-fluorescence intensity for each size bin
Consumables	None
Time to alarm	Adjustable 15 or 30 second time constant. A 15 minute ambient-tracking aerosol signal history is used in alarm protocols
Alarms	Red LED and >100dB piezoacoustic alarm, plus serial link digital alarm output
Communication	Data wirelessly transmitted to remote monitor; device alarm is used to trigger air sampling protocol
Operating time	Essentially unlimited if powered externally, or >24 hours on UBI 2590 rechargeable battery
Operating life	Air pump: 30,000 - 40,000 hours. UV light source: greater than 20,000 hours
Operating range	-20°C to 60°C. Operation to 60°C is permitted up to a total time of 1000 hours
Humidity	0 to 95% non-condensing
Power	Less than 6 watts
Start-up time	1 minute

Air Sampler Specifications

Operating principle	Collection by electret dry filter media
Air collection rate	HEPA-style filter: User adjustable 10 LPM to 49 LPM; bioaerosol filter: User adjustable 50 LPM to 300 LPM
Filter collection efficiency	HEPA-style filter: More than 95% for > 0.3 μm diameter; bioaerosol filter: 50% at 0.5 micron diameter
Filter media size	4.4 cm active diameter. Mounted in 6.0 cm diameter injection-molded holder
Sampling protocol	User-adjustable delay, sampling period and/or frequency of collection
Filter mass and composition	HEPA-style filter: 2.2 mg/cm ² for active media; 8.6 mg/cm ² including backing scrim; bioaerosol filter: 12 mg/cm ² Both filters are composed of polypropylene electret micro-fiber.
Temperature range (operating and storage)	-40° to 70°C (operating and storage)
Humidity range	All-weather: Rain shield prevents wetting of filter during rainy conditions
Decontamination	Water-tight design allows decontamination with 1 to 5% bleach solution. Fan shell and motor/rotor assembly may be removed for decontamination
Drive fan	High efficiency centrifugal fan with electronically commutated drive motor. Fan life is 30,000-40,000 operating hours
System controls	Sampler is slaved to biodetector. User-defined sampling protocol is run when biodetector sends a trigger signal
Sound level	45-61 dB (A) at 1 meter; peak value at exhaust port

Thermal and Visible-Range Cameras

Thermal IR Imaging Camera Maximum Capability

Sensor type	Uncooled Amorphous Silicon FPA			
Working band	8 μ m - 14 μ m			
Sensor size	17 μ m			
NETD(300K)	≤ 60MK			
Image enhancement	Supported			
Digital zoom	1X, 2X, 4X			
Video display	White Hot/ Black Hot			
Resolutions	384 x 288		640 x 480	
FOV	19mm: 19.5°×14.7°	40mm: 9.3°×7°	19mm: 32.0°×24.2°	40mm: 15.5°×11.6°
Detecting range	Vehicle: 2570m Man: 550m	Vehicle: 5400m Man: 1170m	Vehicle: 2570m Man: 550m	Vehicle: 5400m Man: 1170m
Recognition range	Vehicle: 640m Man: 130m	Vehicle: 1350m Man: 290m	Vehicle: 640m Man: 130m	Vehicle: 1350m Man: 290m

Daylight Imaging Camera Maximum Capability

Video sensor	1/2.8" CMOS, 2.13MP
Effective Pixel	1920(H) x 1080(V)
HD video (Network)	1080P30, 720P60, 720P30, 1080P25, 720P50, 720P25
HD video (SDI)	1080P30, 1080I60, 720P60, 720P30, 1080P25, 1080I50, 720P50, 720P25
Zoom	Optical: 20X Digital: 12X
Lens	F = 4.7mm(wide) – 94mm(tele), F1.6-3.5
View angle	59.5°(wide) – 3.3°(tele)
Min illumination	Color: 0.0013Lux, Mono: 0.0008lux
WDR	On/Off
WB	Auto
Focus	Auto / Manual
IRIS	Auto / Manual
S/N ratio	Not less than 50 dB
BLC	On/Off
DNR	1-5 Steps / Off
Day / night	Auto / Manual

Research International reserves the right to change specifications without prior notice.



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