

# CBRN Patrol

Model RSN 5000 Robot



## Multi-Functional CBRN Solutions

**THE CBRN PATROL MODEL RSN 5000** 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 400 meter range from the robot to the sensor control software.

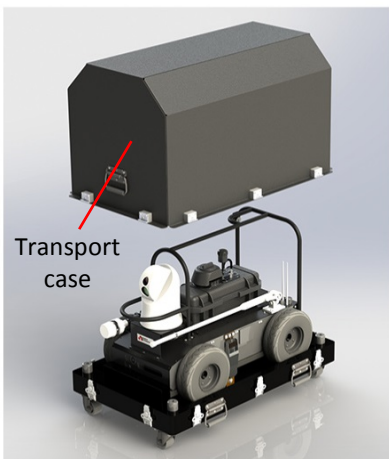
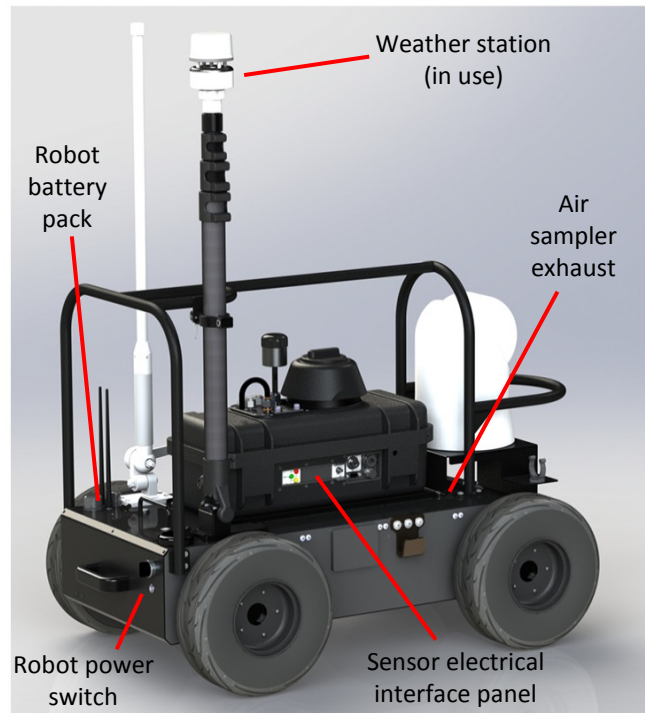
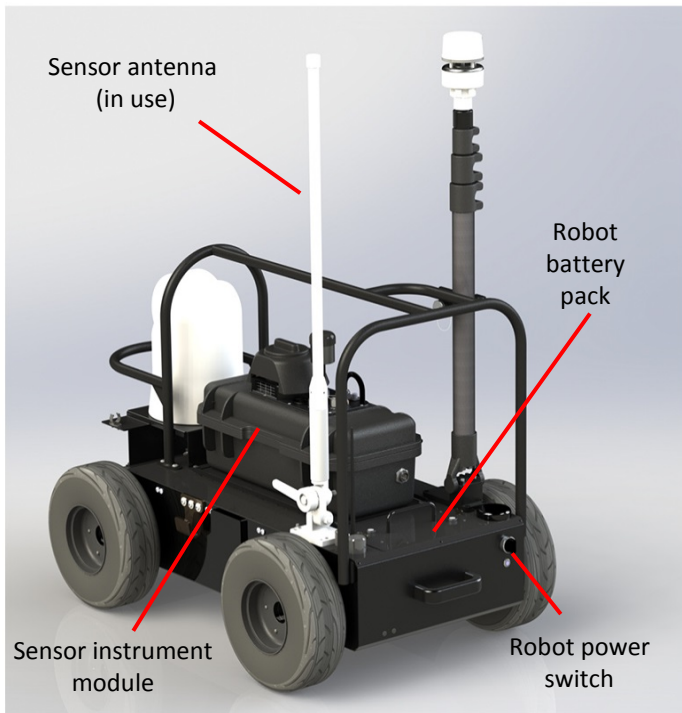
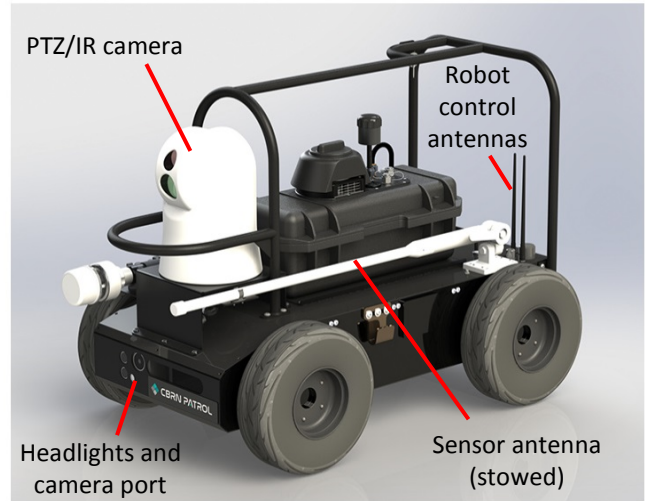
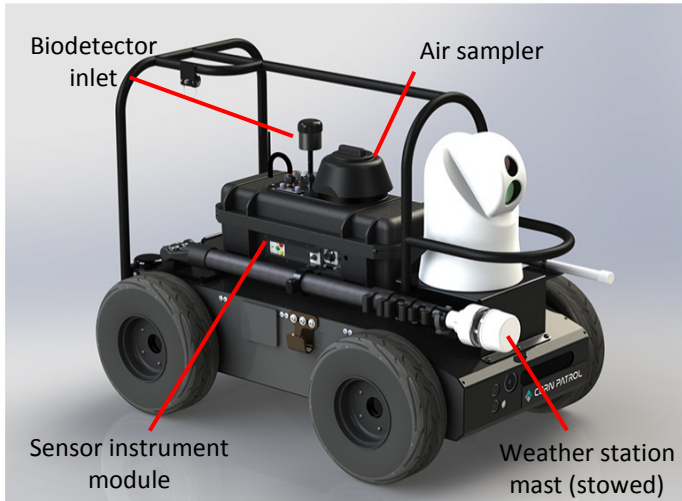
**The vehicle** can handle rough terrain, wet or dry, including sand, rock concrete, gravel, grass, and soil. It also climbs steep angles and negotiates most curbs and steps.

## KEY FEATURES

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

## APPLICATION AREAS

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



<b>Wheeled Robot Specifications</b>	
<b>Component/Feature Options</b>	<b>Function</b>
<b>Terrain</b>	Sand, rock, concrete, gravel, grass, soil and others wet and dry Slope: > 45°
<b>Maximum vertical step</b>	155mm (6")
<b>Stair climbing</b>	Max stair step height 110mm (4.5") Traverse: > 200mm (8")
<b>Speed</b>	0 – 11Km/hr
<b>Turning radius</b>	min 750mm (29.5") diameter of turning space
<b>Night time operation</b>	Headlight equipped
<b>Ground clearance</b>	88mm (3.5")
<b>Operator remote control</b>	Wireless gamepad
<b>Autonomous navigation</b>	With GPS and 9 DOF IMU (Gyro/Accelerometer/Compass)
<b>Terrain</b>	Sand, rock, concrete, gravel, grass, soil and others wet and dry Slope: > 45°
<b>Maximum vertical step</b>	155mm (6")
<b>Stair climbing</b>	Max stair step height 110mm (4.5") Traverse: > 200mm (8")
<b>Motors</b>	24V, 80W x 4 output; 100kg-cm/wheel, 2.75A nominal, 16A peak
<b>Payload</b>	30kg onboard, 50 kg dragging
<b>Video/audio</b>	Color Camera (640x480, 30fps) with audio
<b>Operating temperature range</b>	-30° to +50°
<b>Shock resistance</b>	Drop to concrete: Max: 1200mm (4ft) Rated: 900mm (3ft)
<b>Movement control</b>	5 Hz GPS, gyro/accelerometer/compass, 9 DOF IMU
<b>Communication</b>	Wi-Fi 802.11G
<b>Operator control</b>	Wireless gamepad
<b>System monitoring</b>	Battery level and motor temperature
<b>Power</b>	LiPo 22.2V, 2ea x10AH modules, 4 hours continuous operation
<b>Dimensions</b>	265mm (10.5")H x 573mm (22.5")W x 615mm (24")L
<i>Research International reserves the right to change specifications without prior notice.</i>	

<b>Biodetector Specifications</b>	
<b>Component/Feature Options</b>	<b>Function</b>
<b>Operating principle</b>	Monitoring of 365nm UV-stimulated particle scattering and bio-fluorescence using photon counting electro-optics.
<b>Particle size and type</b>	<1 to 15 microns in four size ranges. Responds to aerosolized bacteria, spores, viruses, and toxins
<b>Interferents</b>	Interferent resistant to diesel smoke, pollen, silica dust
<b>Detection limit</b>	Less than 30 ACPLA at 90% confidence limit
<b>Sampling rate</b>	1.2 liter per min of ambient air nominal
<b>Data output</b>	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
<b>Consumables</b>	None
<b>Time to alarm</b>	Adjustable 15 or 30 second time constant. A 15 minute ambient-tracking aerosol signal history is used in alarm protocols
<b>Alarms</b>	Red LED and >100dB piezoacoustic alarm, plus serial link digital alarm output
<b>Communication</b>	Data wirelessly transmitted to remote monitor; device alarm is used to trigger air sampling protocol
<b>Operating time</b>	Essentially unlimited if powered externally, or >24 hours on UBI 2590 rechargeable battery
<b>Operating life</b>	Air pump: 30,000 - 40,000 hours. UV light source: greater than 20,000 hours
<b>Operating range</b>	-20°C to 60°C. Operation to 60°C is permitted up to a total time of 1000 hours
<b>Humidity</b>	0 to 95% non-condensing
<b>Power</b>	Less than 6 watts
<b>Start-up time</b>	1 minute
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<b>Air Sampler Specifications</b>	
<b>Component/Feature Options</b>	<b>Function</b>
<b>Operating Principle</b>	Collection by electret dry filter media
<b>Air Collection Rate</b>	HEPA-style filter: User adjustable 10 LPM to 49 LPM Bioaerosol filter: User adjustable 50 LPM to 300 LPM
<b>Filter Collection Efficiency</b>	HEPA-style filter: More than 95% for > 0.3 µm diameter Bioaerosol filter: 50% at 0.5 micron diameter
<b>Filter Media Size</b>	4.4 cm active diameter Mounted in 6.0 cm diameter injection-molded holder
<b>Sampling protocol</b>	User-adjustable delay, sampling period and/or frequency of collection
<b>Filter Mass and Composition</b>	HEPA-style filter: 2.2 mg/cm <sup>2</sup> for active media; 8.6 mg/cm <sup>2</sup> including backing scrim Bioaerosol filter: 12 mg/cm <sup>2</sup> Both filters are composed of polypropylene electret micro-fiber
<b>Operating Temp. Range</b>	-40° to 70°C
<b>Storage Temp. Range</b>	-40° to 70°C
<b>Humidity range</b>	All-weather: Rain shield prevents wetting of filter during rainy conditions
<b>Decontamination</b>	Water-tight design allows decontamination with 1 to 5% bleach solution Fan shell and motor/rotor assembly may be removed for decontamination
<b>Drive fan</b>	High efficiency centrifugal fan with electronically commutated drive motor Fan life is 30,000-40,000 operating hours
<b>System Controls</b>	Sampler is slaved to biodetector User-defined sampling protocol is run when biodetector sends a trigger signal
<b>Sound Level</b>	45-61 dB (A) at 1 meter; peak value at exhaust port
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<b>Thermal and Visible-Range Cameras</b>				
<b>Thermal IR Imaging Camera Maximum Capability</b>				
<b>Sensor Type</b>	Uncooled Amorphous Silicon FPA			
<b>Working Band</b>	8µm - 14µm			
<b>Resolutions</b>	384X288	640X480		
<b>Sensor Size</b>	17µm			
<b>NETD(300K)</b>	≤60MK			
<b>FOV</b>	19mm: 19.5°×14.7°	40mm: 9.3°×7°	19mm: 32.0°×24.2°	40mm: 15.5°×11.6°
<b>Image Enhancement</b>	Support			
<b>Digital Zoom</b>	1X, 2X, 4X			
<b>Video Display</b>	White Hot/ Black Hot			
<b>Detecting Range</b>	Vehicle: 2570m Man: 550m	Vehicle: 5400m Man: 1170m	Vehicle: 2570m Man: 550m	Vehicle: 5400m Man: 1170m
<b>Recognition Range</b>	Vehicle: 640m Man: 130m	Vehicle: 1350m Man: 290m	Vehicle: 640m Man: 130m	Vehicle: 1350m Man: 290m
<b>Daylight Imaging Camera Maximum Capability</b>				
<b>Video Sensor</b>	1/2.8" CMOS, 2.13MP			
<b>Effective Pixel</b>	1920(H) x 1080(V)			
<b>HD Video (Network)</b>	1080P30, 720P60, 720P30, 1080P25, 720P50, 720P25			
<b>HD Video (SDI)</b>	1080P30, 1080I60, 720P60, 720P30, 1080P25, 1080I50, 720P50, 720P25			
<b>Optical Zoom</b>	20x			
<b>Digital Zoom</b>	12X			
<b>Lens</b>	F = 4.7mm(wide) – 94mm(tele), F1.6-3.5			
<b>View Angle</b>	59.5°(wide) – 3.3°(tele)			
<b>Min Illumination</b>	Color: 0.0013Lux, Mono: 0.0008lux			
<b>WDR</b>	On/Off			
<b>WB</b>	Auto			
<b>Focus</b>	Auto / Manual			
<b>IRIS</b>	Auto / Manual			
<b>S/N Ratio</b>	Not less than 50 dB			
<b>BLC</b>	On/Off			
<b>DNR</b>	1-5 Steps / Off			
<b>Day / Night</b>	Auto / Manual			
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