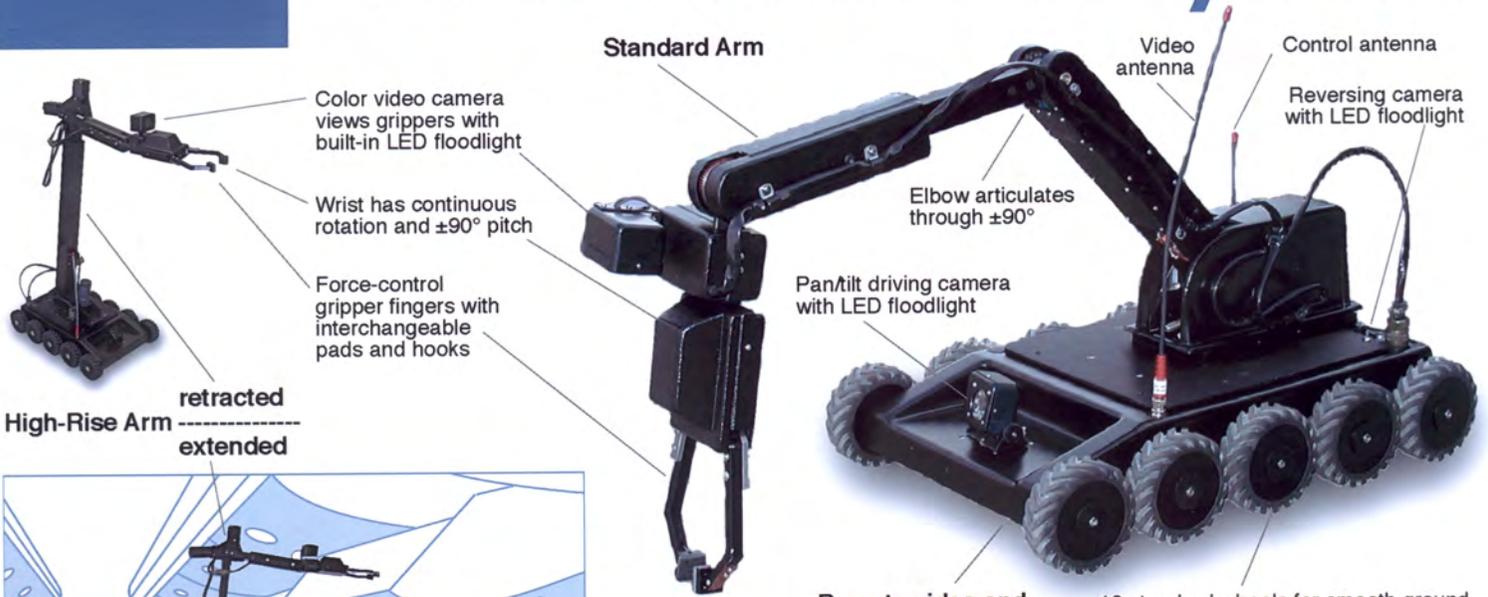
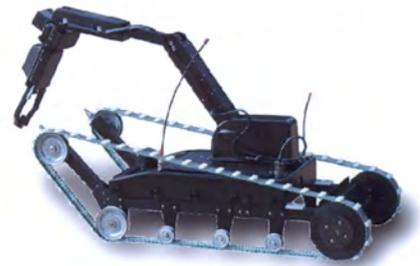


MURV-100 Robot System



The MURV-100 can fit into narrow aircraft aisles and use the High-Rise Arm to investigate, remove or disrupt suspicious items in overhead luggage bins at heights up to 245cm (8 ft)



The only robot that can lift and carry its own weight - 23kg



Inspect the underside of cars rapidly, directly by video, not through mirrors



Carry in car - deploy by hand



Fire disrupters at ground level from Standard Arm or 245cm elevation from Highrise Arm

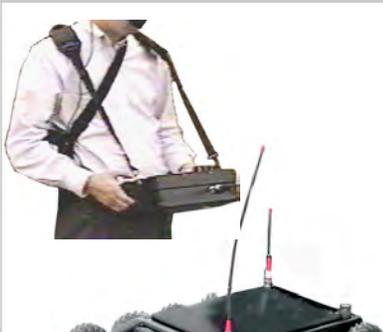
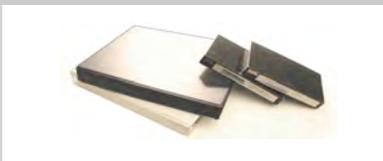


I. I. & E., INC.

MURV-100 Robot System

Basic Vehicle without Arms

Consisting of these items ---

<p>MURV-100 Basic Robot Vehicle plus Basic Radio Control Console</p>	<p>MURV-100 Basic Robot Vehicle is equipped with driving camera (b/w, pan/tilt) and reversing camera (b/w, fixed) both with built-in LED floodlights.</p> <p>Basic Radio Control Console controls the MURV-100 vehicle via a matched pair of transceivers. It has no video screen but the robot can be driven in visual range, or a small TV receiver can be used to receive and display the video from the vehicle.</p>	
<p>Shoulder Harness for Radio Control Console</p>	<p>Shoulder harness in black ballistic Nylon for convenient carry of Basic Radio Control Console, shown above right. Useful when the Control Console Hardcase will not be purchased.</p>	
<p>Elevator Block</p>	<p>Elevator Block attachment goes between MURV-100 vehicle and Standard or High-Rise Arm when it is desirable to raise them by 30cm</p>	
<p>Video Antenna with Tripod</p>	<p>Provides the via ceo link via tripod-mounted Yagi directional antenna (control link is provided via Control antenna mounted in Control Console Hardcase)</p>	
<p>3 Vehicle Battery Packs 2 Console Battery Packs</p>	<p>A fully charged Vehicle Battery Pack powers a MURV-100 from 3 to 4 hours, depending on severity of mission. Console Battery Pack lasts 4 to 6 hours</p>	
<p>1 Battery Charger 2 Charger Adapters</p>	<p>Battery Charger will charge vehicle and console batteries, both when installed as well as removed from their units (via Charger Adapters). Battery Charger plugs into AC (specify 110 or 220V) or 12V DC, and has CHARGE and FLOAT indicator lights</p>	
<p>Fastener, Fuses & Small Tools Kit</p>	<p>Box of fasteners, fuses and small tools for occasional replacement needs</p>	
<p>Operations Manual & Video, Maintenance Manual & Video</p>	<p>For reference and training, in English; For videos, specify system: NTSC or PAL</p>	

Pelican Hardcases for all robot components

Pelican-brand waterproof hardcases outfitted with customized foam inserts. We can supply the right sizes of cases for all your robot components — Vehicle, Standard Arm, Long Arm, Track Assembly, Turntable, Base Pitch Assembly, Recoil Disruptor Arm, etc. — and will make recommendations depending on the items in your order.



SIM (Sensor Interface Module) for any WMD sensor

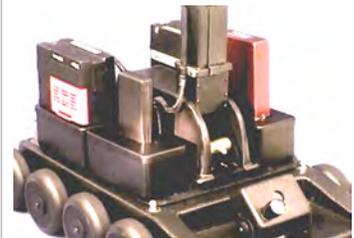
If the WMD sensor is compact enough to be handheld, the MURV-100 robot car carry it to the site of the WMD threat.

Each WMD sensor is interfaced by means of a SIM (Sensor Interface Module) with each SIM adapted for a specific WMD sensor. We stock SIMs for the most popular sensors (see below) and will custom-produce the SIM needed for the sensor of your choice at no extra charge.

Each MURV can carry up to 4 sensors and SIMs.

In this picture the black base is the SIM, the yellow unit strapped to it is the sensor (here a RAE sensor for toxic gases)

Each SIM contains a light source to illuminate the sensor display, a video camera to "look" at it, a remote on/off switch, and any other remote functions which the particular sensor requires. The video camera sends an error-free analog view of the display back to the control console's monitor, preventing digital errors and noise.



Examples of WMD Sensors *(we do not sell these sensors but can assist you with purchasing them)*

Sensors are available today to investigate the presence of-
Blister/Nerve Agents, Toxic Gases, Radioactive Materials, and Explosives.
(Biological sensors are not yet small enough to use on a MURV-100)
We produce SI Modules for the sensors shown here:

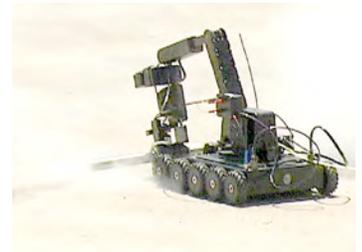
- Microsensor System Minicad MK II for Tabun, Sarin, Soman, Mustard, DMMP, etc.
- Draeger Multiwarn for concentration of toxic gases.
- Radiation Pager-S to for gamma and nuclear radiation.



Proparms Recoilless Disruptor 20mm caliber, with Storage Container and Spare Parts Kit



20mm caliber Recoilless Disruptor is ideally suited for firing from small robots, such as the MURV-100, at any angle and at elevations from below ground to 265cm above ground. Can also be fired from a camera tripod. Includes mounting bracket for attaching disruptor to elbow or to hand of Standard Arm. Rangefinder is extra.



Dual-Laser Aiming Rangefinder with Camera and Firing Circuit

This triple-purpose unit mounts on the disruptor barrel. Its twin lasers provide (1) exact distance and (2) precise aiming. Away from the target the two lasers are adjusted so that their beams intersect at the desired distance. At the target the robot is moved forward until the two laser dots coincide as viewed through the b/w camera, indicating correct distance and aim. The Firing Circuit provides the electrical impulse to fire the cartridge.



Disruptor Ammunition

Electrically or percussion-primed cartridges of 20mm caliber and from 30 to 80 grain; Avon-type frangibles w/cartridge, and steel slugs. Price breaks at 100 and 500pcs.



Charge Placer

Charge Placer accessory deploys a small disposable tray at a precise location, usually under a vehicle. In the tray can be an explosive charge, a stand-alone video camera or a sensor. A small b/w video camera looking straight up locates the precise spot for the operator to lower the container to the ground. Includes 20 disposable trays.



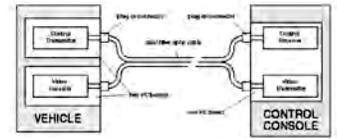
Fiber Optic Control System (add cable)

Transmits control and video signals via dual fiber optic cable where RF is not possible (inside metal structures such as aircraft, ships, bank vaults, tunnels, etc.) or undesirable (where radio silence must be maintained).



Fiber Optic Cables: Available Lengths 100m, 200m, 300m

2-conductor fiber optic cables with connectors on both ends are required for use with Fiber Optic Control System (above), and supplied on a spool. Order cables separately, selecting length. One or two spare cables should be ordered here or included with spare parts package.



Operational Diagram of Fiber Optic Control System

Manual Spool for Fiber Optic Cables

Simpler and more economical than a powered reel drawing current from the vehicle batteries, the Manual Spool stays with the Control Console while the departing robot unrolls the fiber optic cable freely off the open end of the spool. Re-uptake of the cable is done manually (shown here).



2-Way Audio System

For communicating from the console to the robot and back. Useful for hostage negotiations, enabling the operator to hear voices and other sounds in the vicinity of the robot and to speak through the robot-mounted speaker.



AUX Diagnostic Box

Function checking device for verifying the control inputs to the robot's tools. LEDs indicate if the vehicle's auxiliary tools (turntable, camera, disruptor, base pitch, laser sights, etc.) are receiving proper signals from the console via the remote control system. If a tool does not function while its corresponding LED does light up, the problem is in the tool. If not, the problem is in the control system. A most important use of this box is for checking and verifying the safety of the weapons firing circuit and sequence.



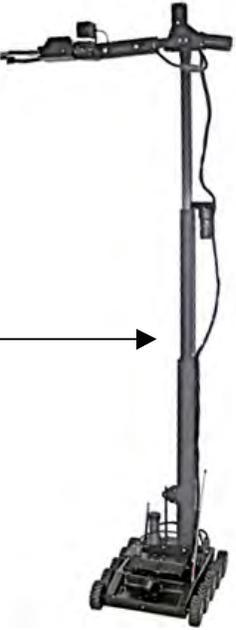
ARM Diagnostic Box

This function checking unit is for verifying the control inputs to the robot's arms. The top section of this box serves as test substitute for the arm. LEDs indicate proper operation when corresponding switches on the control console are operated. If an arm function does not work but its corresponding LED do light up, the problem is in the arm. If not, the problem is in the control system. The bottom section serves as a mini-control box to exercise and test the arm independent of the robot's regular control system.



<p>Big-Wheel Set with Gripper Tires (6)</p>	<p>For climbing kerbs and steps, as well as traversing sand and mud, 6 big wheels with gripper tires replace the 10 small wheels. Each tire comes pre-mounted on its own wheel for easy installation or removal in the field.</p>	
<p>Track Attachment</p>	<p>The Track Attachment is bolted to the vehicle and replaces the wheels, for climbing stairs, traversing rough ground and crossing other obstacles. The Track Attachment can be installed or removed in the field, using a screwdriver.</p>	
<p>Quick-Change Option on Wheels (10 + 6) and Drive Axles (10)</p>	<p>An upgrade requested by wealthy desert countries. While regular wheels are attached and removed by turning a central screw with a screwdriver, this option permits changing the wheels without the chance of dropping the screws in the sand.</p>	
<p>Complete Spare Set of all 16 Tires</p>	<p>This set consists of the tires only - 10 standard tires and 6 gripper tires. Useful as replacements if and when a tire get worn, damaged or lost. Not an urgent requirement since any required spares for the MURV-100 can be delivered by courier world-wide in a just few days.</p>	
<p>High-Speed Motor Option</p>	<p>This option increases the maximum speed of the MURV-100 by a factor of 1.6 and comes at some loss of torque and fine low-speed control.</p>	<p>no picture</p>
<p>Counterweight</p>	<p>Counterweight plate mounts between turntable and arm and carries up to 5 weights which serve to balance the robot when its arm is horizontal and carrying a heavy item or has a disruptor mounted on it.</p>	

<p>15" Flat-Panel Video Monitor in Hardcase for Control Console</p>	<p>This accessory consists of a Pelican Hardcase to house the Basic Control Console (provided with the vehicle on Page 1) and a 15-inch Flat-Panel Color Video Monitor for razor-sharp viewing. Also incorporates antenna plugs to connect video and control antennas (see Page 2).</p>	
<p>Overview Color Camera, with Pan, Tilt, Zoom and LED Floodlight</p>	<p>The overview camera is mounted on a stalk and combines remote-control zoom, pan and tilt, augmented with a bank of LED floodlights. It gives a selectable view separate from the other cameras, which can be recorded at the control console on video disk or cassette.</p>	
<p>Zoom Option on Driving Camera or Wrist Camera</p>	<p>Although we do not recommend this option because it is disorienting to the operator, we can equip the driving camera and/or the hand camera with zoom capability.</p>	
<p>Color Option on any b/w Camera</p>	<p>If desired we can provide any camera in color.</p>	
<p>Halogen Floodlight</p>	<p>Not required for the video cameras - they have built-in LED floodlights and produce good images at very low light levels - but some operators prefer to have floodlight illumination available for human eyes..</p>	
<p>Carrier for X-Ray Source, plus Holder for 8 x 10" X-Ray Film Cassette or Digital Imager</p>	<p>For taking X-rays of objects remotely, MURV-100 places Film Holder behind object, aims X-ray source in Carrier, triggers it via remote firing circuit, then brings Film Holder back to operator. Recommended X-ray sources are Golden Engineering's XR-150 or XR-200.</p>	
<p>Quad Video Display Option (4 views)</p>	<p>This option lets the operator toggles a switch to show either four images or one image on the monitor. In the "4" position, the views from all four robot cameras appear on the monitor at the same time; In the "1" position only one camera's view is seen, with the viewing camera selected by the "Camera Select" switch in the normal manner.</p>	

<p>Standard Arm with Wrist, Camera and Grippers</p>	<p>Standard Arm detaches via push-click bayonet mount for low-profile viewing under cars and furniture. Elbow and wrist each bend $\pm 90^\circ$, wrist rotates both ways continuously. Color camera on wrist has built-in white LED floodlight. Hand comes with all gripper tools shown below.</p>	
<p>Hand with Wrist, Camera and Grippers</p>	<p>The Hand attaches to the High-Rise Arm equipping the MURV-100 to investigate, rotate, lift or remove suspicious items remotely.</p>	
<p>High-Rise Arm with Camera and Disruptor Mount</p>	<p>High-Rise Arm attaches to MURV-100 vehicle just like the Standard Arm, but can operate at elevations from 90cm up to 245cm, such as the overhead luggage compartments of aircraft, to view suspicious items and render them safe by firing a disruptor.</p>	
<p>Additional Gripping Tools for the Hand</p>		<p>Bars w/Small Tacks Straight Pins Curved Pins Pipe Bomb Tool</p>
<p>Cable Cutter</p>	<p>High-strength precision tool designed to bolt to the gripper fingers of the Hand</p>	
<p>Turntable</p>	<p>Although the robot itself can perform a spot-turn on its wheels, the Turntable permits the robot arms to be turned 95° right and left. This feature works both with the Standard Arm and the Extendable Arm.</p>	

MURV-100 Robot System

Specifications

Robot Vehicle	without an arm	w/Standard Arm held horizontal	w/Standard Arm held vertical	w/Highrise Arm held vertical
Length	58cm	124cm	58cm	58cm
Width	43cm	43cm	43cm	43cm
Height	11cm	30cm	124cm	100 to 245cm (*)
Height (using elevator block)	n/a	61cm	155cm	130-275cm (*)
Weight	14kg	23kg	23kg	30kg

(*) Highrise arm telescopes

Control Console	on shoulder harness w/o hardcase	in hardcase w/color LCD
Width (right—left)	32cm	61cm
Depth (front—back)	24cm	48cm
Thickness (up—down)	11cm	22cm
Weight	4kg	16kg

Arm Joints	Standard Arm	High-Rise Arm
Range of movement at shoulder	0° to 90°	+10 to -10°
Range of arm bending at elbow	+90° to -90° (180° total)	this arm has no elbow
Range of wrist pitching up-down	+90° to -90° (180° total)	+90° to -90° (180° total)
Range of wrist rotation	± 360° continuous rotation	± 360° continuous rotation
Range of turntable rotation right—left	+90° to -90°	+90° to -90°

Mobility	Standard Wheels (10)	Large Wheels (4 to 6)	Track System
Wheel diameters	11.5cm	15.24cm	two tracks
Ground clearance	3.3cm	5.3cm	13.2cm
Maximum speed, standard drive	18m/min (1.1km/h)	23m/min (1.4km/h)	6.1m/min (0.37km/h)
Maximum speed, optional high-speed drive	34m/min (2.0km/h)	43m/min (2.6km/h)	11.3cm/min (0.68km/h)
Maximum height of traversable step (*)	22cm	30cm	36cm
Maximum width traversable ditch (*)	31cm	36cm	40cm
Maximum angle of lateral stability (arm held low)	35°	35°	45°
Maximum angle of climbable dry surface	43°	45°	48°

(*) more with techniques using arm

Control and Video Systems	Standard RF	Extended Range RF	Fiber Optics
Open range line-of-sight	300m	500m	100, 200 or 300m
Built-up areas	100m	200m	100, 200 or 300m

Lifted/Supported Weight in Hand	Standard Arm	High-Rise Arm
With arm near vertical	22.7kg	21.1kg
With arm horizontal	5.5kg	not applicable
With arm horizontal and optional counterweights	11.0kg	not applicable

Power Supply	Vehicle	Control Console
12 Volt sealed gel-cell batteries in modular power packs <i>(replacement gel-cell batteries available world-wide from local industrial supply houses)</i>	2 pcs in 1 module	1 pc in 1 module
Run time on one charge <i>(depends on severity of use)</i>	3 to 4 hours	4 to 5 hours
Battery charger, automatic, charge rate controlled; <i>(runs on AC at 110/120V or 220/240V or 12V DC car lighter)</i>		

Environmental Characteristics	
Operating temperature range	-30° to +75° C
Operating humidity range	0 to 99% non-condensing
Water	Splash-proof and water-resistant but not submersible