

Tactics, Techniques and Procedures for the Recon Scout® XT Throwbot™ System

Draft: September 8, 2010



Introduction

The Recon Scout® XT Throwbot™ is a relatively new device to military and police communities. Soldiers, Sailors, Marines, special forces and SWAT team operators use these throwable, mobile robots to obtain real-time video of hostile or potentially unsafe areas – information that can give them a tactical advantage over potential adversaries.

This document intends to outline typical Tactics, Techniques and Procedures (TTPs) for the Recon Scout XT. Included are suggestions on how to use, carry and deploy the Throwbot, and how to utilize the robot and key accessories in completing a variety of missions.

The Recon Scout XT Throwbot System

The basic Recon Scout XT Throwbot system consists of a 1.2lb two-wheeled micro-robot and a handheld Operator Control Unit (OCU). In addition, a Recon Scout SearchStick™ pole is useful in situations where a pole camera gives the best reconnaissance of a confined or hard-to-reach space, and a Recon Scout Bayonet Mount can be used to gain immediate situational awareness while maintaining cover.



Key Specifications/Capabilities - Recon Scout XT

Weight: 1.2 lb

Length: 7.3 in

Battery Life: 1 hour

Shock Resistance: horizontal throws of 120'; drops of 30'

Water Resistance: Incidental immersion to a depth of 1' for up to 5 minutes

Range: Indoors (NLOS) to 100'; Outdoors (LOS) to 300'

Automatic-On Infrared Optics

Three military frequencies, allowing the use of three robots in the same environment at the same time

Key Specifications/Capabilities - Recon Scout OCU

Weight: 1.8 lb

Length: 8.8" (including antennas: 20.75")

Battery Life: 2.25 hours

Screen Size: 3.5"

Single joystick controls the movement of the robot



Key Specifications/Capabilities - Recon Scout SearchStick

Weight: 3 lb

Collapsed Length: 20.5"

Maximum Extended Length: 72"

Actuated jaws grasp and release the robot to function as a pole camera

Battery Life: 3,000 cycles

Single button controls opening/closing of jaws

Allows for viewing over and around cover, and for discreet placement of the robot



Key Specifications/Capabilities - Recon Scout Bayonet Mount

Weight: .12 lb

Size: 4" L x 1.6" W x .85" H

Allows the robot to be attached to a rifle

Allows for viewing around corners and other cover



Key Specifications/Capabilities – 5590/2590 Charger

Allows the team to charge the robot in the field using their standard BA5590 batteries



Level of Deployment

- It should be noted that, in most cases, a tactical team would not plan a mission specifically around the Recon Scout XT Throwbot unless it was known in advance that a specific target area included hostile environments that would not otherwise be easy to inspect.
- In most cases, the Recon Scout XT should be deployed on an as needed basis at the lowest team level, and should be part of the team's equipment every time the team deploys. If the robot is employed as a company- or platoon-level asset, the chances of successfully using it drop significantly because the robot will not be readily available to strike teams. The Recon Scout XT is designed to work quickly and easily without slowing the team's normal pace of operations. The key is to have the Throwbot in the hands of the team when their mission and safety hinge on gaining immediate situational awareness.

Carry Methods

At a total system weight of 3 pounds, the Recon Scout XT and Operator Control Unit (OCU) are designed to minimize a soldier's carry load while providing maximum utility and safety. There are several methods for carrying the robot and OCU:

- Eagle Bag (attached to the back of a team member)
 - o This set up allows the team member deploying the Recon Scout XT to provide security while another team member controls the movement of the robot and views its video transmissions on the OCU. This tactic keeps both team members in the fight and able to respond if engaged by the enemy. (Fig 1)



Fig 1

- Molle Strap
 - o A molle strap can also be used to attach the robot to a team member so that it is readily accessible. The advantage of this method is that it allows for very rapid deployment of the Recon Scout XT. The disadvantage is that the exposed robot could snag other gear or clothing. (Fig 2)



Fig 2

- Lanyard hook (attached to the tail)
 - o This simple carry technique allows the soldier to clip a lanyard hook to the tail of the robot. Note in Figure 2 that there is also a line attached to the robot's activation pin, which would turn on the robot when pulled. This method allows for rapid deployment, but could also cause the pin to be inadvertently pulled, turning on the robot and draining the battery. (Fig 3)



Fig 3

- o Like the molle strap, snagging is a possibility with this carry method.
- o Note that the OCU should be carried in a pouch or pack until the Recon Scout XT is deployed.
- Deployment Suggestion
 - o The activation pin should always be attached with a lanyard to a pack or vest. This prevents the robot from being deployed without first turning the robot on, and it also keeps the activation pin from being lost. (Fig 4 & 4a)



Fig 4



Fig 4a (Note dummy corded inside Eagle bag)

Charging Methods

The Recon Scout XT robot and OCU can be charged at any conventional electrical outlet. In addition, the robot and OCU can be simultaneously charged in the field using a ReconRobotics 5590 Charger and any standard BA5590 battery. A vehicle charger is also available.

Tactical Use

Unlike other military robots, the Recon Scout XT is designed to be thrown, and is capable of surviving repeated throws of up to 120'. This capability makes it ideally suited for use by dismounted soldiers at the patrol level. One of the most common uses of the Recon Scout XT is as a tool for conducting point, route or area reconnaissance.

- Clearing Courtyards, Fences, Rooftops and Walled Compounds Before Entry – **Three Methods**
 - o Use the Recon Scout SearchStick™ pole to look over the wall or fence without deploying the robot. Use the actuator jaws on the SearchStick to grasp the Recon Scout XT so its optics face forward (Fig 5). Extend the SearchStick to the necessary height and raise the robot to the necessary height to inspect the target area. Another team member will use the OCU to view the robot's video feed and direct the team member with the SearchStick to slowly pan over the environment. When the inspection is completed, the SearchStick pole can be retracted and the robot removed from the jaws of the pole. (Fig 6)
 - o Attach a lanyard to the tail of the Recon Scout XT and toss the robot over the fence or onto the rooftop. Use the lanyard to retrieve the robot when reconnaissance is completed. A 100' black lanyard that clips to the tail of the Throwbot is part of the kit. The robot should be thrown by grasping the main body of the robot, not the tail. Once the robot lands, the joystick on the OCU will be used to direct its movement. Additionally, in very low ambient light the infrared optical system on the robot will automatically turn on, giving the soldier a clear view even in complete darkness. When reconnaissance has been completed, simply retrieve the robot using the lanyard. (Fig 7)



Fig 5



Fig 6



Fig 7

- Throw in the robot, conduct reconnaissance by directing the robot to move through the environment, and then enter the area to collect the robot once the reconnaissance has been completed. If the team knows that it will enter the environment, this method is preferable since it enables thorough reconnaissance of the area with the robot. If the team knows that physical entry into the environment is not possible or advisable, then either of the two previous methods is preferred. If the robot is lost or destroyed in an operation, the team can substitute another Recon Scout XT of the same frequency and the original OCU can be re-used with this new robot. The robots and OCUs are matched pairs and are available in any of three military frequencies, allowing soldiers to deploy up to three robots/OCU pairs in the same environment at the same time. This tactic is particularly useful when clearing a large or multi-level structure. (Fig 8)



Fig 8

- Clearing/Inspecting Air Ducts and Ventilation systems
 - Care should be used in searching metal air ducts because the radio frequency (RF) signal from the robot can be affected by the metal ductwork. Always use the lanyard attachment when moving the robot through narrow ductwork.
- Clearing/Inspecting Rooms/Structures Prior To Entry
 - This is best accomplished using a two-man team, one to throw the robot into the environment and another to operate the OCU, direct the movement of the robot and view its video transmissions. The initial introduction of the Recon Scout XT should be accomplished by throwing it through an open door or window, or driving it over the door threshold. The operator can then use the robot to locate suspected adversaries and noncombatants, identify IEDs and learn about the layout of the room and secondary entry points. If the robot identifies a room or closet that it cannot see into, the OCU operator can alert the team and position the robot to watch the door as the team moves in to clear it. If at any time the operator observes movement in the doorway, he can alert the team.

- The robot can also be attached to an M4 or M15 rifle using a Recon Scout Bayonet Mount. This allows the soldier to see into a room or around a corner without deploying the robot. (Fig 9)



Fig 9

- Clearing Attic Spaces
 - By using the SearchStick the Recon Scout XT can be placed into an attic space and later retrieved when inspection has been completed.
 - The Recon Scout Bayonet Mount can also be used to obtain a view into an attic space if the height of the opening is accessible with a rifle alone.
 - The robot can also be thrown into the attic, but this will not be effective if there are exposed rafters that can trap the robot.
- Clearing Culverts
 - The Recon Scout XT can be used to clear culverts without putting personnel in the direct line of sight of the culvert opening. (Fig 10)
 - The lanyard should always be used so that the robot can be retrieved from the culvert without team members walking down into danger area. Attach the lanyard to the robot tail, pull the activation pin on the robot and lower or throw the robot into the culvert opening. Stay clear of culvert while operating the OCU to maximize standoff distance.



Fig 10

- Inspecting Structures Through Windows
 - o The Recon Scout XT can be thrown through a first-, second- or third level window to conduct video reconnaissance of unknown area. Get eyes in the building before entry. The robot can be tethered prior to throwing it through the window, or thrown in without a tether.
 - o If the objective is to clear a multi-story structure before sending in personnel, throw the robot (with no lanyard attached) into an upper story window. Conduct reconnaissance on that level, and then drive the robot down to lower floors via the stairway. (Figure 11)
 - o Many second story windows can be accessed with the SearchStick. Operators can look through the window while the robot is mounted on the pole and, if need be, release the Recon Scout XT through the window by opening the jaws on the pole.
 - o When clearing enclosed stairways, work your way up or down by tossing the robot to the next landing and using it to survey the route. As the team moves towards the robot, the OCU operator can use the robot to watch ahead for movement. Repeat this process to clear the entire stairwell.



Fig 11

- Clearing Crawl Spaces
 - o Since the Recon Scout XT is only 4.5" tall, it can access very narrow openings such as crawl spaces or vehicle undercarriages. These inspections can be completed with or without a lanyard. (Fig 12)



Fig 12

- Clearing Basements

- The Recon Scout XT can easily be thrown into lower basement areas from upstairs or through window access points. Once inside the lower level, the robot can be positioned to watch access points for adversaries moving into the area from a stairway or trap door. (Fig 13)



Fig 13

- Clearing Caves

- By using the lanyard attachment, the Recon Scout XT can be lowered into cave areas for inspection. In cases where the team will be entering the cave, throw or drive the robot ahead of the team to clear areas before moving forward. Note that the transmission range of the robot will typically be reduced in a cave or tunnel.

- Gaining Visuals Around Corners, From Cover
 - o The robot can also be handheld to gain visuals around a corner, up a stairway or through a hatch. This technique should be used when a SearchStick or Bayonet Mount is unavailable and the situation does not call for the robot to be thrown or driven. This procedure is best executed as a team with one member pointing the robot optics at the target area and another member monitoring the OCU. (Figure 14)



Fig 14

- Inspecting Wells
 - o Since the Scout XT™ is water resistant to a depth of 12 inches for up to five minutes, the robot can be lowered into wells to search for adversaries, weapons caches and explosives. Attach the lanyard to the tail, and ensure that the plugs are in place within the charging port and activation ports on the robot and that the cover is over the optics. Lower the robot into the well for inspection. Remain clear of well opening throughout the inspection. (fig. 15)



Fig 15

- Securing Danger Areas or Entry Points
 - o As a force multiplier, leave the Recon Scout XT behind to keep eyes on a danger area as the team conducts room clearing. This allows the team member monitoring the OCU screen to alert the team if an adversary emerges from or enters an area.
 - o The robot can also be positioned to monitor foot or vehicle traffic along a path or roadway. Position the robot with a view of the area and, if necessary, conceal its location. The team member monitoring the OCU can be positioned in cover up to 300' away.
- Clearing Dead Space Without Movement By Force Protection or Security Forces
 - o Security forces in static positions can use the Recon Scout XT to periodically clear surrounding dead space without leaving points of cover or secure areas.
- Identification of Explosive Devices, EOD Reconnaissance or Inspection of Unknown Packages
 - o During route clearing operations or foot patrols, if the team comes across a suspicious package, IED or unexploded ordnance, the robot can be thrown or driven up to the object from a safe distance for inspection. This allows the team to keep a 300' standoff distance and maintain a rapid tempo of operations.
 - o If the package is found not to be an IED, the team can proceed on the mission, saving valuable time that would otherwise be spent waiting for EOD personnel to arrive with much larger robot systems. In cases where inspections suggest the presence of an IED, the EOD team should be called for further inspection. (Fig 16)



Fig 16

- Inspecting Vehicle Undercarriages
 - o The Recon Scout XT can be used at vehicle checkpoints or along travel routes to inspect vehicle undercarriages without requiring security personnel to leave protected areas. In these instances, the robot should be driven under the vehicle while maintaining a safe standoff distance. The robot's infrared optics will automatically turn on if the ambient light is low. (Figure 17)
 - o For close inspections, the SearchStick can be used with the robot to visually inspect the undercarriage. Grasp the robot in the SearchStick jaws so the optics on the robot point at an upward angle. Inspect the perimeter of the vehicle's undercarriage.



Fig 17

- Using the SearchStick and Recon Scout XT as a Pole Camera
 - o The Recon Scout XT can be turned into an effective Pole Camera with the use of the Recon Scout SearchStick.
 - o The SearchStick device is an expandable pole system that holds the robot at a right angle so that the camera on the robot can be used to view elevated areas or confined spaces without throwing the robot. This is best accomplished with a two-man team with one soldier holding the robot and another monitoring the video transmissions on the OCU.
 - o This allows for stealthy reconnaissance over a wall or into a compound, and does not require that team members throw the Scout into an area from which it may not be recoverable. (Figures 18 & 18a)



Fig 18



Fig 18a

- Using the Recon Scout Bayonet Mount
 - o Use of bayonet attachment system allows the Recon Scout XT to be quickly used as a pole camera during close quarters combat when the soldier must see around corners, or through windows or doors while maintaining cover from fire.
 - o The Recon Scout Bayonet Mount will fit onto the standard issue M16A2 5.56mm rifle on the bayonet mount of the front sight post, allowing the robot to be attached as a camera.
 - o The weapon system can still be fired with the robot attached to the bayonet mount.



Fig 19

TTP provided by ReconRobotics, Inc. www.ReconRobotics.com