HOW WILL THE USE OF REMOTE CONTROLLED TECHNOLOGY IN HIGH RISK TACTICAL SITUATIONS IMPACT OFFICER SAFETY BY 2020?

by

Lieutenant Anthony T. Martinez
Fresno Police Department

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The Command College Futures Study Project is a FUTURES study of a particular emerging issue of relevance to law enforcement. Its purpose is NOT to predict the future; rather, to project a variety of possible scenarios useful for strategic planning in anticipation of the emerging landscape facing policing organizations.

This journal article was created using the futures forecasting process of Command College and its outcomes. Defining the future differs from analyzing the past, because it has not yet happened. In this article, methodologies have been used to discern useful alternatives to enhance the success of planners and leaders in their response to a range of possible future environments.

Managing the future means influencing it—creating, constraining and adapting to emerging trends and events in a way that optimizes the opportunities and minimizes the threats of relevance to the profession.

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"Let's be careful out there." A quote made famous by Actor Michael Conrad who played the seasoned Sergeant Phil Esterhaus on the television series 'Hill Street Blues'. That sentiment, for some even that exact quote, has been echoed by watch commanders everywhere at the end of briefings, as they send police officers out onto patrol.

Hill Street Blues ran from 1981 to 1987. Within the fields of computer technology and robotic development, two additional things were occurring at the same time. While related to one another, neither was being associated with the police work portrayed on 'Hill Street Blues'. In 1981, a direct drive robotic arm was invented; this placed a motor on the joint of the arm itself, making it more accurate than previous robotic arms. (Fish 2) In 1985, Microsoft launched the Windows program Windows 1.0; this significantly changed computer usage as we know it today from a code or command writing system to a point-and-click program. (Microsoft 2)

What do all of these things have in common? One need only fast-forward 25 years from the time of Sergeant Esterhaus' patrol briefings on television to find that law enforcement has absorbed the use and benefits of modern day computers, along with the benefits of deploying remote controlled robots.

Presently, within the field of law enforcement, robots are commonly used in Special Weapons and Tactics (SWAT) and Explosive Ordinance Disposal (EOD) applications. In SWAT, they are primarily intelligence gathering tools and in EOD, they are used to examine potential ordinance and ordinance disposal. In SWAT, the majority are smaller, hand-held models and in EOD, they are larger, remote controlled devices. These tools work in place of an officer, in these recognized hazardous assignments. (Personal Interview Reynolds)

In essence, within the fields of both SWAT and EOD, robots are already commonly used to gather intelligence or reduce officer exposure to danger. The proposal studied aims to advance the usage of robots within the field of law enforcement significantly, in a continued effort to protect police officers' lives. With the current state of both robotic and computer technology, the proposal is within realistic research and development expectations. The robot would actually replace an individual officer on a search warrant entry or other high-risk tactical situation. By initially deploying a remote-controlled robot, there would be no chance for loss of life during the initial entry or breach of a target location. This would be accomplished because there would be no police officers entering the building; conversely, the robots would not be armed with lethal weapons during their deployment, ensuring there is no loss of life to the occupants within the target location.

Current Robot Usage

The use of robots in assembly line production work has been common practice; using robots in repetitive assembly tasks is where many people first saw robots working in place of humans, such as in the automotive industry. Technology and programming advances have seen significant advances since the time of task-specific robot programming.

Today, robots are used in a multitude of professional settings outside of warehouse or assembly line tasks. Robots are currently being used in such areas as medicine, prisoner management and Hazardous Material (HAZMAT) response, to name a few.

In medicine, people have grown accustomed to robotic extensions of human hands, for example, doctors use remote controlled tools to perform surgical procedures requiring precise accuracy. What about a robot that is actually working in place of a doctor? Doctor Paul Vespa, Director of Neurocritical Care at University California Los Angeles (UCLA), is currently using a

remote controlled robot to make some of his rounds. Vespa visits his patients in their hospital rooms via robot and checks on their status. He can communicate with the patients through audio-visual equipment on the robot and even check vitals via a stethoscope. What some may not realize, the doctor is doing this from a remote location, maybe even his home, giving him the capacity to tend to more people in less time. (Dance 2)

Robots are currently being tested in place of prison guards at a prison in Pohang, South Korea. The Asian Forum of Corrections (AFC) is using robotic technology to replace the need for some of the direct observation tasks of correctional officers. Some of the functions the robots are being programmed to monitor and track are the behavior of the prisoners. As the robots make observation passes, similar to human prison guards, they record how the prisoner is acting. By monitoring any changes in a prisoner's patterns of behavior, the robot can alert a correctional officer of a potential problem. (Knapp 2) According to Lee Baik-Chul, AFC chairman, the robot is designed to help both the prisoners and the correctional officers; it protects the prisoner's life and safety, while lessening the workload for the correctional officer. (Gruber video gallery) This is one phase of a broader push by South Korea to be a leader in robot production; businesses in South Korea are currently manufacturing robots capable of performing a wide range of tasks. Some of the other projects include robots being used in homes, education and as guards along the North-South Korean border.

In response to HAZMAT disasters, there are robots capable of entering exposure sites and testing the levels of contamination, minimizing the necessity for humans to be exposed. Additionally, with audio and video capabilities, robots can also transmit information so problems can be identified from a safe location. Some robots are handling other types of hazardous materials, for example, radioactive parts found in nuclear facilities. By using robots to handle

and work in these hazardous environments, the "people factor" is the motivation behind minimizing the risk and exposure to the human versus the machine. (Brumson 1)

Robots in Police Work

Presently, robots are primarily used in two general fields: units involved in Special Weapons and Tactics (SWAT) operations and those responsible for Explosive Ordinance Disposal (EOD).

The robots being deployed by SWAT and other tactical teams are designed to be used as intelligence gathering tools. The robots are small and either remote-controlled into or thrown into a target location. Once inside, the robot is maneuvered around so the handler can use its audio and video equipment to gather information as the robot scans the location. The information and video obtained is used to help prepare officers that may be deployed inside the location, giving them a tactical advantage they would not have had, when entering the location human-first. Additionally, some robots have equipment capable of establishing communication between police and the subjects contacted.

Lieutenant Jon Papaleo, Fresno Police Department SWAT Commander (2012), described the evolution and implementation of electronic technology in the SWAT field. "If you would have told me in SWAT training 15 years ago that we would be using remote-controlled cameras to check inside buildings before we enter, I never would have believed you. But today, that is a common tool for SWAT teams. Police are continually learning to do things better, smarter and safer."

It is common practice to see a bomb robot on EOD calls. Police use robots to work in place of humans in various aspects of investigating and handling potential explosive devices. Robots are used to examine or x-ray suspicious devices, transport them, record their handling

and actual detonation. The research and development of this type of equipment continues and improvements are regularly displayed at police trade shows; things like improved video cameras capable of capturing detailed information and improved grabbing devices for handling sensitive materials and explosives are refined. Sergeant Robert Reynolds, Fresno Police Department EOD team member and EOD robot handler (2012), showed the value of using a robot on EOD and SWAT calls: "Why do we use robots? It is so I don't get killed. Why does SWAT ask for the robot? It's so they don't get shot at."

In 2012, a robot was introduced with the goal of facilitating the work of disabled veterans and police officers. Jeremy Robbins, along with the Discovery Lab at Florida University International, released a remote controlled robot that would be controlled by disabled personnel, allowing them to continue serving the public via the use of a robot. Robbins is a lieutenant commander in the United States Navy Reserves and came up with the idea while serving in Afghanistan; he wants the robot to help disabled veterans and police officers continue to serve their communities. The handler would be able to control the robot and communicate with the public through the robot, having it perform many service-related tasks including community policing functions and surveillance assignments. The motivation being that although the person controlling the robot may no longer be able to perform some of these tasks due to a physical limitation, they remain capable of controlling a robot as it performs the tasks. (Hellegaard 2)

Leap into the future

Current robotic technology levels are at a point where a prototype could be designed that would be capable of maneuvering within a target location and completing the search and find aspect of a building entry. Because the robot handler would be able to see everything the robot is exposed to, the handler could identify and detain occupants through the use of the robot. The

audio and video equipment installed would allow the individual handler the ability to communicate with the person encountered. For those that attempted to hide from the robot's visual equipment capabilities, each one would also be deployed with currently used heat-seeking equipment, capable of detecting people hiding from view. What if the person simply refused to cooperate or attacks the robot? The fact that their intent is committed during contact with the robot, prior to police officers entering the location, would provide a tactical advantage to the human entry team during the second phase of the entry.

The proposal can borrow traits from all of the robots mentioned, borrowing tools from each and applying them to a robot capable of replacing a human police officer in unsafe or hazardous conditions. To begin, a futures-thinking manager would need to decide whether this is a true benefit or not. A guarantee that neither a police officer nor an occupant of a target location is ever killed again during the initial entry phase of a search warrant or tactical operation is the foundation to assess that benefit against possible cost or logistical considerations. After all, losing or damaging a machine is always better than the loss of human life.

With no loss of life guaranteed, the next question may be: how is this possible? Simple; each robot would be controlled by an officer (similar in concept to what people currently use in interactive video games), the police officer would never be in danger. Similarly, since the robot making the entry would not be human, there would be no need for it to be equipped with lethal force options. This would ensure the interaction between the entry robot and the occupants of the target location simply couldn't kill one another.

There are additional specifics that would need to be identified and addressed throughout the Research and Development portion of the project. With the rapidly advancing state of robotics development, nothing required in the creation of the proposal would be considered

impossible or even far-fetched for a designer today. There are, though, obstacles to the deployment of entry robots into policing.

Possible obstacles

This robot would be far from standard operating procedure in police work. As with any new piece of equipment, the further from the norm, the more potential concerns may surface with its application. A group of experts from Law Enforcement, Education and Civic groups were polled and concerns were identified in three categories: economic, political and social.

The economic concerns focused on the seed money necessary to begin the research and development of the prototype. This included the money necessary to equip a building with the necessary support equipment for storing and controlling the robots. Each stage of the implementation would be experimental and require much testing to establish a foundation. Obviously, as advances were made and technology deemed usable, the expenses would level and eventually become purchase and maintenance costs only. Some of this could be offset with Federal grant monies available for law enforcement use. The United States Defense Advanced Research Projects Agency (DARPA) has created contests, offering cash awards, for advances in robotic development, to be used by the military. There are many universities and private companies that continue to experiment and develop advances in their own robotics. All of these venues could be tapped for technological assistance that would help research and development efforts, reducing the need to start from scratch.

The political concerns focused on the legal aspects of using robots in place of humans. Legal definitions and case law would need to examine and include these tools as extensions of humans. The Fourth Amendment includes a protection against ‘unreasonable searches’ and opponents of this proposal may try arguing using a robot to enter someone’s home is

unreasonable; conversely, proponents would need to argue that the robot itself, is a safety device, working for the protection of life. Similar legal challenges have gone before the Supreme Court involving invasion of privacy concerns with cellular phones, video cameras and unmanned drone aircraft, in essence, the government's use of modern technology to invade areas previously considered off-limits. As with any new tool, laws and legal challenges would need to be addressed as they arose, with none foreseen as complete deal-breakers for the proposal.

The social aspect was determined to be the largest potential obstacle. Almost every robot can be considered a tool that has helped people in one form or another. Whether it did hazardous, repetitive, heavy, task-specific or work that required precise operation, the robot was helping. Although the proposed robot would help law enforcement, it might place it at odds with public opinion due to the need to confront occupants of a target location. This would require marketing, explanation and exposure to robots as extensions of police before it would be successful. To reach a point where a robot would be accepted on an entry team, it would first need to be introduced as a completely helpful entity. For example, it might initially be deployed as a greeter at the police department or in a public mall, so the public grows accustomed to interacting with it. Similar to Robbins' robot proposed for disabled veterans and police officers, the initial versions would need to provide a positive level of service.

As the public grew accustomed to seeing a helpful police robot, its tasks could expand, eventually replacing or supplanting officers in tactical situations. This progress with exposure and acceptance would simultaneously occur as other robots continue to be introduced in various fields, for example, like Vespa's medical robot. Something as simple as laptops for school-age students in classrooms or robotic teaching aides would assist the proposal as the next group of young adults experiences higher levels of exposure to technology than any prior generation.

Next Steps

A futures-minded manager can create the foundation for this transition by acknowledging the potential of robots and gather support from their police agency and city. This can begin by showing current levels of technology and the positive impact of robots working in place of humans. The next step would be to contact a research facility willing to experiment with this proposal. At this step, there would be financial support required, some robotic projects have been started with a $500-700,000 budget to reach prototype. There are multiple factors that can influence the initial costs including: is there a similar robot in use that can be modified (current technology), who will be doing the development, for example, a university group versus a private company and the amount of research information and details provided to the developer at the onset.

A portion of the financial aspect would also be a cost benefit for robot implementation; although many immediately identify with the start-up costs, there are cost savings associated with the assurance there would be no future loss of life during these types of police operations. Another aspect is the reality that technology continues to progress and it is in law enforcement's best interest to be prepared for policing in the future. The person implementing the change would need to explain that once the initial research and development were complete, the costs would eventually transition to primarily purchase, item improvement and maintenance. Additionally, from the development side, many research organizations already have support sources willing to assist with start-up funds.

A significant step would be the initial designs of what is proposed; giving the stakeholders something to see and understand exactly how these robots will look, be equipped and operated and how they will be controlled by individual officers. Once these foundational

steps are completed, there would be enough interest for articles, news features, project exposure and a better grasp of what the level of support or opposition can be anticipated. This would create a pathway to the actual robot prototype segment of the proposal.

Conclusion

The current level of robotic technology makes this proposal within reach through research and development. By removing one half of the human element from the current human versus human element contact faced by police during search warrants and tactical operations, it guarantees no loss of life. For years, other professions have used robots, with public acceptance, for years to do things quicker, smarter and safer.

Fast-forward to 2020…will watch commanders still be telling their officers to be careful? Yes, it is safe to say officers will always be told to take care, be safe, sent out on patrol with positive words of advice and encouragement. Will the watch commanders of 2020 also be requesting robots? That remains to be seen. Sergeant Esterhaus may not have seen that coming, but a futures-thinking manager today may be doing just that; switching the thought process from wishing officers well, to ensuring that we never lose another officer in a search warrant or other high-risk tactical situation.

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