

# Law Enforcements Move to Automation as the Future of Policing

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## **Abstract**

*As technology changes, so must law enforcement. To meet these challenges a look at emerging technologies must be made to determine how they will affect the officers and the citizens they serve. From the legalities of unmanned surveillance to the challenge of the self-driving cars law enforcement must rush to meet this new world of automation. What will policing look like in the future and where are we now? Sworn law enforcement agencies in Florida were surveyed to determine how prepared they were for this coming revolution.*

## **Introduction**

Law enforcement has always had to evolve and modify its investigative strategy to combat new trends in criminal behavior. From the beginning these modifications have focused primarily on changes of modus operandi and things do not seem to be changing anytime soon.

Early in law enforcement all it took to be an officer was someone who was tough enough to handle the average citizen that they would encounter on the street and who could take direction from a superior officer. That began to change from a technology standpoint with the invention and accessibility of motor vehicles. This helped expand the range of criminal groups and provided a means of escape, forcing law enforcement to adapt by acquiring faster cars and train on improving their driving skills. This still did not require much more intelligence on the officer's part but more mental acuity for improved reaction time and enhanced motor skills.

Where things really began to turn around for the typical officer was around the time personal computers were available to the majority of the general population. With computers, unseen criminals were able to "rob banks", launder money and commit fraud on a level never seen before. Even people who were not pre-disposed to criminal behavior found the lure of easy money intoxicating. These new developments were well outside the abilities of the stereotypical "beat cop" mold from days-gone-by. It did not matter how brave or strong you were when the crime was being committed in the virtual world. In response to the change in modus operandi the new generation of law enforcement began to evolve.

As the law enforcement mission began to change so did the requirements to become an officer. Height requirements and fitness requirements changed. Departments could no longer use the same criteria of selecting an officer as in the past to be effective. The newer officer had to be more tech savvy and able to multitask or they became ineffective. The benefit to the change is it made the calling to be an officer available to a broader range of society. The down side is it is difficult to keep pace with the changes. Similar to when it found itself outgunned in the 80s and had to adapt

quickly, law enforcement is facing a new phase of technology and will have to find a way to compensate before finding itself “outgunned” again.

With the advancements in computer technology we are on the brink of artificial intelligence and robotic or autonomous inventions that are sure to change policing in the near future. Though many of these advents are positive by increasing safety and security, they pose challenges for which the law enforcement community has not prepared.

Though the many avenues that the discussion could take are fascinating and a bit disturbing, we will be focusing broadly on where we are in our use of robotics in law enforcement and where we could be in the near future. We will touch on some concerns lightly such as lost funding revenue due to fewer traffic violations as self-driving cars become the norm and legal concerns as it relates to privacy issues.

## **Literature Review**

### **Current uses of robotic technology in law enforcement:**

Most are already aware of the use of bomb and SWAT robots to protect officers and resolve dangerous situations, but the increased use of drone technology has been the most dramatic increase in applied technology in recent years. Most of the robotics currently in use are directly controlled by a human operator or rely on human manipulation and oversight to perform its functions. There are several agencies who are using robots in a semiautonomous mode already but most are still direct controlled. (Calderone, 2013)

Patrol robots owned or leased by the police are already patrolling airports like LaGuardia and other public places like city parks and convention centers. Tasked with recording its surrounding much like a roving security camera, they are capable of uploading the license plate numbers of vehicles and issuing warnings and public announcements. The robots have the ability to facially recognize every human they encounter, if programed to do so. They can compare those images to databases of known subjects and alert the command center if they encounter a match. Robots like the K5 by Knightscope are beginning to augment law enforcement and act as a force multiplier for law enforcement’s presence at large gatherings to include private businesses and shopping malls. The robot can patrol 24 days a week 365 days a year without breaks and it never calls in sick. “Incorruptible and unafraid, emotionless and tireless, they will be the thin blue line of the mid-21st century, at least until their batteries run down.” (Abel, 2018). One robot can effectively take the place of four to six fulltime officers, if not more. The quote by Abel sums-up the fact that regardless of our feelings on an automated police force and the controversy surrounding the move to automation in general, the change is coming. “But while the cynics titter, LaGuardia’s first-gen robocop uncaringly wheels her way around the human zoo, watching us watching her. And one thing is certain—be they futuristic crime fighters or invasive peeping Toms, the Knightscope K5 and other silicon-hearted spies are not going back in the box.” (Abel, 2018). This quote alludes to the fact that no amount of public pressure will stop the move towards more automation in security and law enforcement, but careful smart regulation

can affect the way it is implemented. (Abel, 2018)

The long-term cost savings due to no injury claims, no retirement benefits and the ability to operate continuously without getting tired or needing breaks will soon outweigh the initial investment costs to do the basic patrol function. This means we are likely to see a change in the future of law enforcement from a purely financial perspective, or at least a significant part of it soon. (Mar, 2016)

Dubai hopes for a “smart” police force where robot police will be the future of law enforcement. The program functions as an initial test run and gives feedback on the success of the robot, a REEM robot, manufactured by the Spanish company PAL robotics and its future capabilities. These currently include reporting a crime, submitting paperwork and paying traffic fines via a touch screen in the robot’s mid-section. Though it is currently being referred to as a glorified kiosk, it is a first step in reaching the goal of a robotic police force. There is concern however on how well the program will be received by the public and if the citizens will feel uncomfortable approaching a robot to report a crime. (Krishna, 2017)

### **Moving into the near future of law enforcement robotic technology:**

With concerns for officer safety and accountability in the forefront of the technological cry-to-arms we have developed things like Tazers and body cameras to not only protect the officer but to protect the rights and lives of citizens as well. The next step would be the deterrence of crime and situational awareness to determine what level of response is needed in any given situation. An autonomous robot or drone could spot trouble before it happens or direct responding officers to immediate threats upon arrival. Advanced information of activities as they are happening could also help commanders determine what level of response to send to a particular call and redirect additional resources as the situation dictates prior to the first officer arriving and being overwhelmed. (Cherni, 2016)

The California town of Chula Vista has been the test bed for a new drone program, using drones to be dispatched to emergency calls ahead of arriving officers to provide situational awareness to responding units. It is touted as potentially saving the life of at least one subject who was seen outside a taco restaurant with a gun. The drone arrived on scene prior to the responding officers and the drone operator saw the subject put the gun to his mouth and light a cigarette, he was able to relay that the “gun” was a novelty lighter to the arriving officers potentially avoiding a deadly misunderstanding. (Solis, 2020)

Drone technology or unmanned aerial vehicle (UAV) technology is advancing in not only the build quality and battery life but in the infrastructure for expanded use beyond single point launch by an officer upon arrival at an incident. With nests, it will be possible to deploy autonomous UAV’s to assist officers with in-progress calls for service. Nests are a protective home or base station situated on municipal buildings, hospitals, radio towers or any other elevated structure where UAV’s can stay charged and ready to be deployed from the field. Remotely upon receipt of an emergency call an operator could deploy the UAV’s to provide officers with real-time information, making their jobs safer and increasing the efficiency of crime-solving and documentation of the incident. (Fleming, 2019)

## **The future of law enforcement robotic technology by 2030:**

We can only speculate about the direction of law enforcement in the extended future (15 to 20 years out) with the speed of advancing technology. Police in Dubai are currently testing “patrol-bots” and advanced technology only seen in sci-fi books and movies. When taking in the expected proliferation of self-driving cars, advanced AI computer algorithms, facial recognition and DNA modeling the opportunities for law enforcement are endless if we stay ahead of the curve. Dubai expects to have at least a quarter of its police force robotic by the year 2030. ““We are looking to make everything smart in Dubai Police. By 2030, we will have the first smart police station which won't require human employees,” Brigadier Khalid Nasser Al Razouqi, the General Director of Dubai Police's Smart Services Department, told *Gulf News*”. (Krishna, 2017). The leap from robots as assistants or as patrol assets to functioning as an independent police department shows a significantly expanded role in the future of law enforcement. (Krishna, 2017)

With the advancement of self-driving cars, the effect on traffic laws will be significant. It's widely expected that autonomous vehicles will make our roads safer as the majority of vehicle crashes are caused by human error. Widespread adoption of autonomous vehicles would reduce the number of traffic fatalities, meaning we would require fewer police officers and EMTs working accident scenes. In addition to the reduced loss of life, we would see a decrease in emotional stress on the responders after a particularly gruesome scene and prolonged disruption of traffic patterns. (Morris, 2017)

## **Concerns, cautions and pitfalls to law enforcements robotic future:**

Most opponents to police using advanced technology in the form of drones, computer algorithms and recognition software are their concerns that stem from Fourth Amendment violations and personal privacy advocates, citing Orwellian fears of an ever-present, ever-watching Police State. Privacy rights advocates are weighing in heavily as police test new law enforcement resources and have expressed that police need to be closely scrutinized in what technology they are exploring and for what purpose. Much like the use of body cams early on, as it becomes more commonplace, many will come to realize that these technologies defend civil liberties as much as they protect the officers from frivolous law suits, as long as the law enforcement community does not abuse its power. A Letter of Record submitted by the ACLU to the Senate Judiciary Committee states their concerns that the low operating cost of drone usage will encourage police departments to engage in increased pervasive surveillance and police fishing expeditions, that were previously tempered by the high cost of owning and using a helicopter for the same functions. (ACLU, 2013)

Public perception and citizen reaction to a future robotic police officer is unclear. Some wonder if people will trust a robot more, by assuming it won't have the social biases human officers may have, thereby leaving a blank slate for the encounter to unfold justly. Another possibility is people might not feel comfortable confiding in a robot to report a crime or they may become frustrated trying to explain the depth of their problems because their inability to articulate their intention into a language the robot

would understand (think automated phone system). A human officer can through gestures, examples, local dialect or slang interpret the basis of a person's legal problem even if it is not clearly communicated by them. This could result in frustration with the encounter and the underreporting of crimes. (Krishna, 2017)

Self-driving cars could mean fewer traffic stops. Around 800,000 drivers get pulled over every day currently and autonomous vehicles could eliminate approximately 56% of those traffic stops, reducing the cost to citizens and the dangers to the officer.

For police officers, traffic stops are high risk endeavors and take away from time spent patrolling to prevent crimes from occurring or dedicating time to current caseloads. For drivers, traffic stops are expensive and stressful. In rare cases, they can have tragic outcomes. Less traffic stops mean less need for traffic enforcement; thus, it could mean fewer jobs for police officers. Another concern is that a major revenue source for governments could be impacted by fewer traffic tickets. It is estimated that traffic tickets represent \$6 billion in fines every year. This does not consider if there will be a need for licenses for autonomous vehicles. As you start adding up all the factors involved in a self-driving future, to include further reduction in issuance of driver's licenses and fewer private vehicle registrations due to more efficient ride-share or corporate owned transportation programs, local revenue could decrease significantly. If a quarter of cars are self-driving by 2030, that revenue could shrink by one-fourth. Citizens will have to pay more in taxes to make up for the shortfall or we will have to reduce the number of law enforcement officers employed. (Morris, 2017)

### **The potential benefits to all stakeholders by embracing robotics in the law enforcement profession:**

A benefit to deploying police robots is that no harm would come to the human officer when a robot officer is forced to employ necessary force to subdue a subject during the course of apprehension. A major factor in police review hearings is whether an officer was in fear for their safety and thus felt compelled to use deadly force. A robotic officer has no concept of fear or any other internal conflict about race, religion, ethnicity or even the heinousness of the crime the suspect committed, only what is legal or illegal. It can only react to a strict set of parameters that have been programmed into its responses and perform those expected responses to a given stimulus. A robot cannot form bias for any group in the traditional sense but can form probabilities based on algorithms that can be mathematically based if programmed to do so. It is up to the programmers to not allow their bias to be programmed into the robotic officer. (Hsu, 2018)

There is support for taking as much of the human element out of law enforcement interactions, even from members of the community one would not expect. Several libertarians have concluded that though privacy is an issue, a robot would be less likely to display bias like a police officer might. An example is; The justification that a subject did not "fit in" with the neighborhood could be used as an excuse to perform a pretextual stop for a minor offence by some officers. Another benefit to an actual vehicle stops by a robot in areas where traffic cameras are currently being used for traffic enforcement is the ticket would be issued to the driver instead of the vehicle owner who is identified by the tag. Currently, if a violation was caught on camera, the vehicle owner is cited due to the inability to know who was driving. If a robot police officer performed the stop, and

identified the driver, it would eliminate confusion and clerical/court costs. Having police officers handing out traffic tickets who are trained to handle criminal complaints are a poor use of available resources. If the decision about the violation of a traffic law can be determined by a robot using an algorithm, that only sees data about driving behavior, then officers' time could be better spent focusing on actual crimes. The added benefit is that if there is no human officer present then the perception that a driver was pulled over because of his or her skin color, whether perceived or real, could be reduced if it was done by a machine that has no bias. The end result would increase public safety. If robots handled the traffic stops police would not have to fear violence from drivers and drivers would not fear being confronted by an overly nervous inexperienced officer or an officer who thrives on the thrill of power and confrontation. Most citizens only have one encounter with law enforcement generally in the form of a stop for a traffic violation. A robotic police officer would ensure the encounter was positive, thus improving public opinion of police. The improvement in police-community relations would generally be improved if the awkwardness of being detained for traffic infractions weren't the most common personal interaction many people have with police. (Nelson, 2018)

## **Methods**

The purpose of this research was to determine the prevalence of robotic systems currently in use by Florida law enforcement organizations and determine their future buildout of these programs.

First a determination of what systems were currently in use, by robotic platform (bomb, swat, drone or interactive "patrol-bot") needed to be made. A random sampling of sworn law enforcement agencies in Florida to include representatives of state, county and city departments was collected and a survey was sent to a random sample of 10% from each category based on size of the department (rounded to the nearest whole number). The agencies were selected by grouping them in the "number of sworn" category based on the March 2020 copy of the quarterly report of Law Enforcement agencies in Florida. After the agencies were grouped into size, a determination of what 10% of each group would be was calculated. Each agency in that category was assigned a number and a random number generator was used to determine the selected corresponding agency. The category sizes were chosen to determine if the size of the agency has any effect on the number of robotic systems in the department or their perceived need to start a robotics program. The category sample size was determined by agencies with less than 25 sworn (group 1), 26 to 50 sworn (group 2), 51 to 75 sworn (group 3), 76 to 100 sworn (group 4) and 100+ sworn (group 5).

Once the percent of agencies that have an active robotics program was known, follow up questions were asked. The survey asked if agency felt the robotic system was of value to their organization and if the agency planned to expand into other robotic platforms or build-out their current robotic platforms in the near future. In addition, it was asked how the robotic platform was obtained (federal grants, local grants, private grants, out of pocket, military LESO program or other means).

For those agencies that did not have a program in place, the survey was to determine what was preventing them from starting a program (cost, too unreliable, too

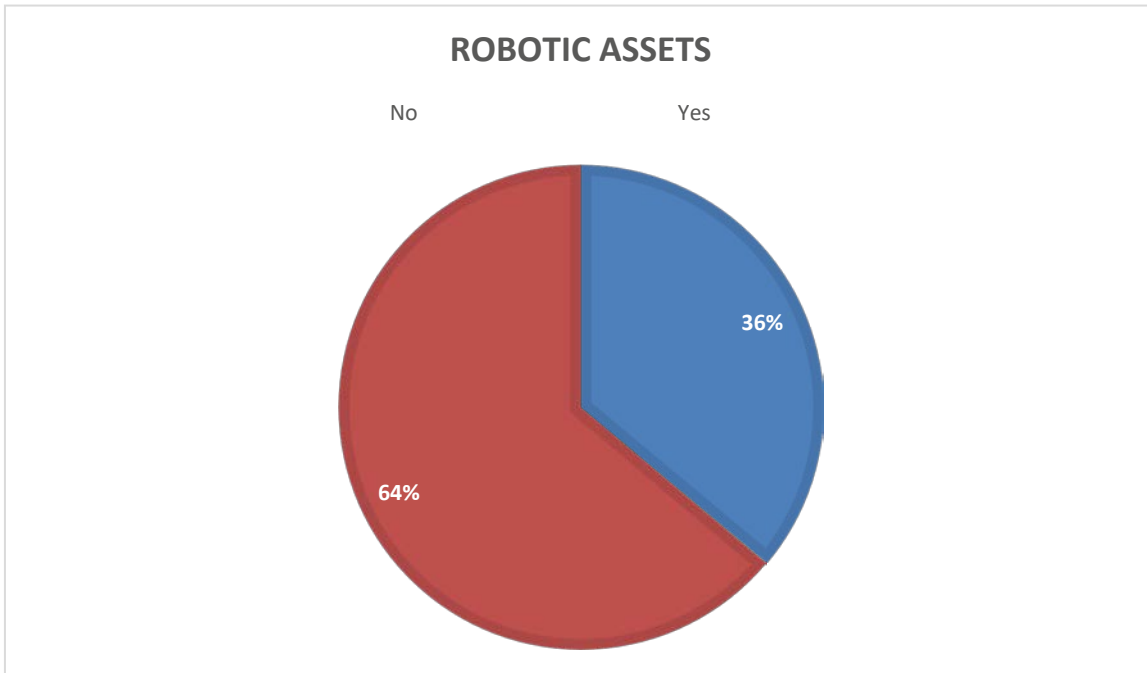
complicated to deal with or did not feel it would be of much benefit).

The weakness in the survey results is that the answers to some questions may not have reflected the agency views but the opinion of the individual tasked with answering the questions.

## Results

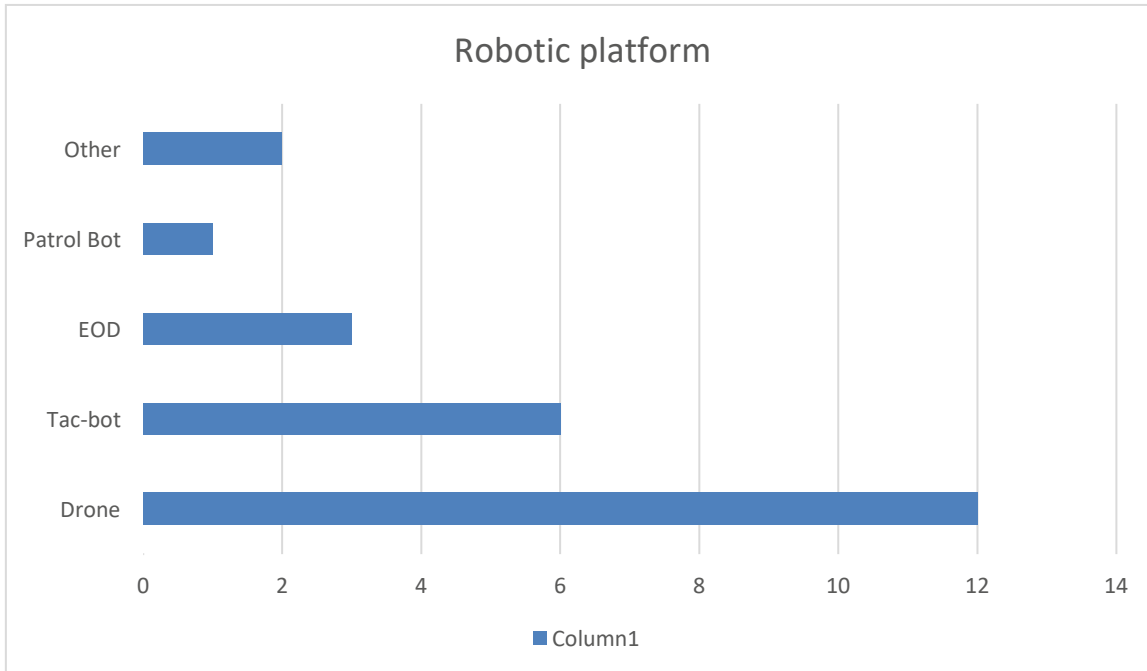
The survey was sent to 39 agencies in total which represented 10% of each of the five groups determined by agency size. Three agencies did not respond in time resulting in a ninety-two percent (92%) response rate. The other 36 agencies will represent the survey results.

The first question was to determine if the agencies had any form of robotic platform. Of the total group surveyed 23 indicated that they did not have any form of robotic platform whereas 13 indicated that they had at least some form of robotic platform.



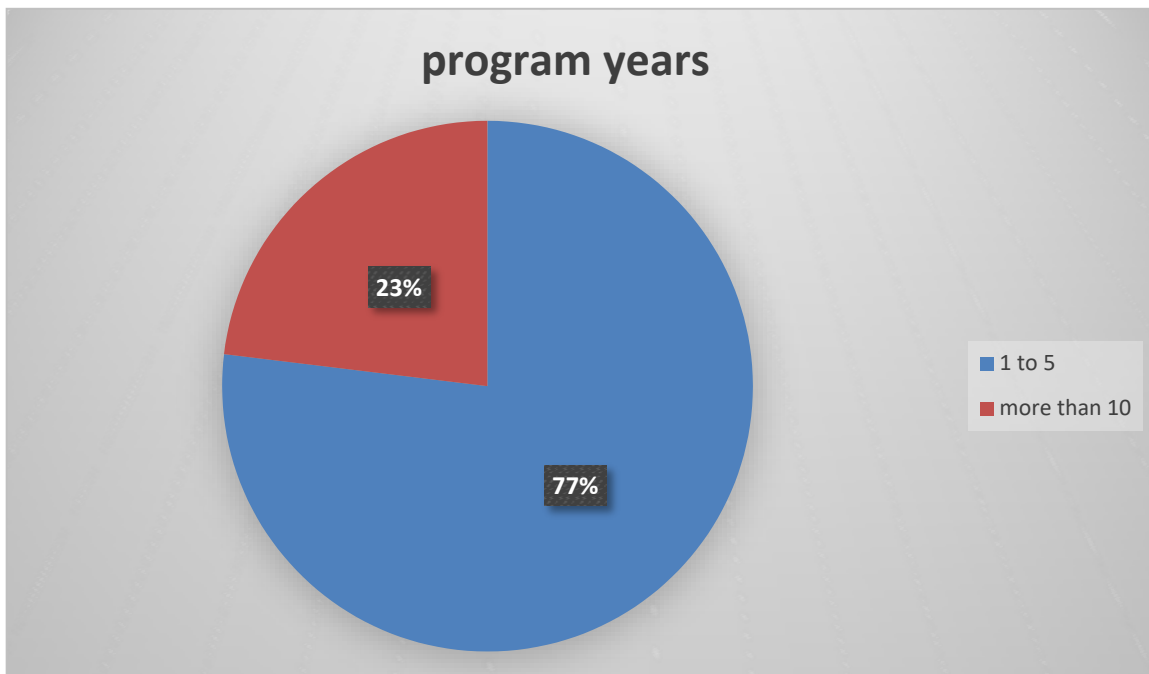
The 13 respondents who chose yes were then directed to the next series of questions to determine the type.

- Drone – 12
- Tac-bot – 6
- EOD robot – 3
- Patrol bot – 1
- Other – 2



The next question was how long has each agency has had a robotics program. The choices were:

- 0 to less than a year – 0
- 1 to 5 years - 10
- 6 to 10 years – 0
- More than 10 years – 3

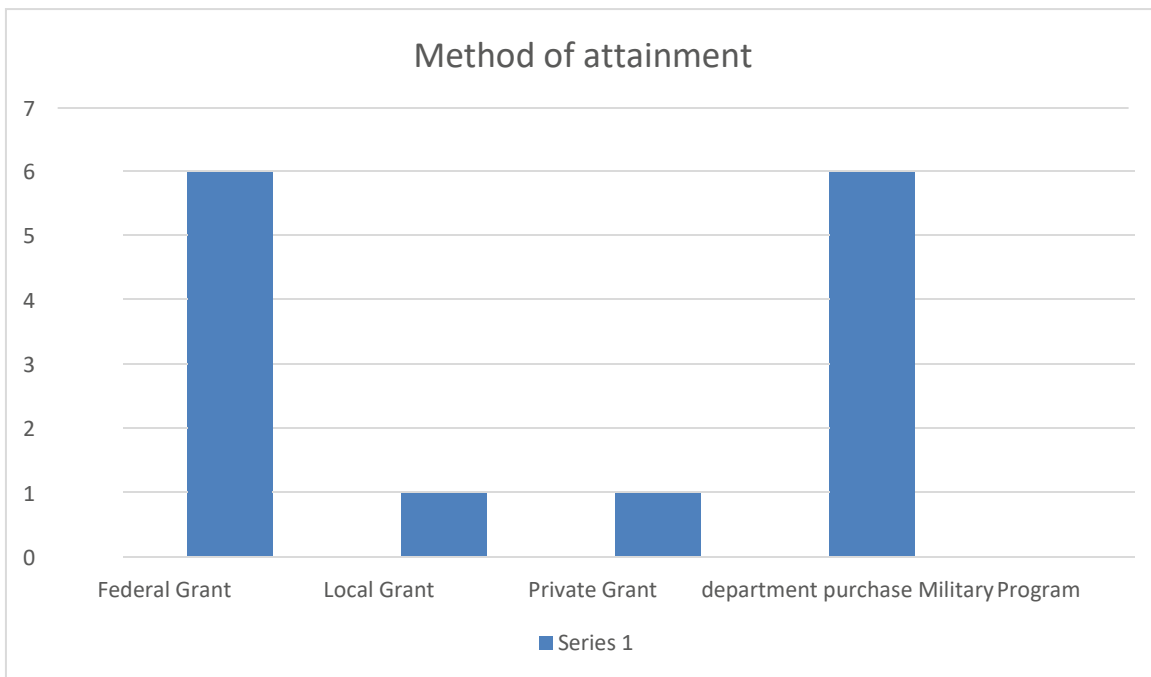




Question four asked if the respondents believed the program was an asset to the department. All responded that they did believe the program was a valuable asset to the department.

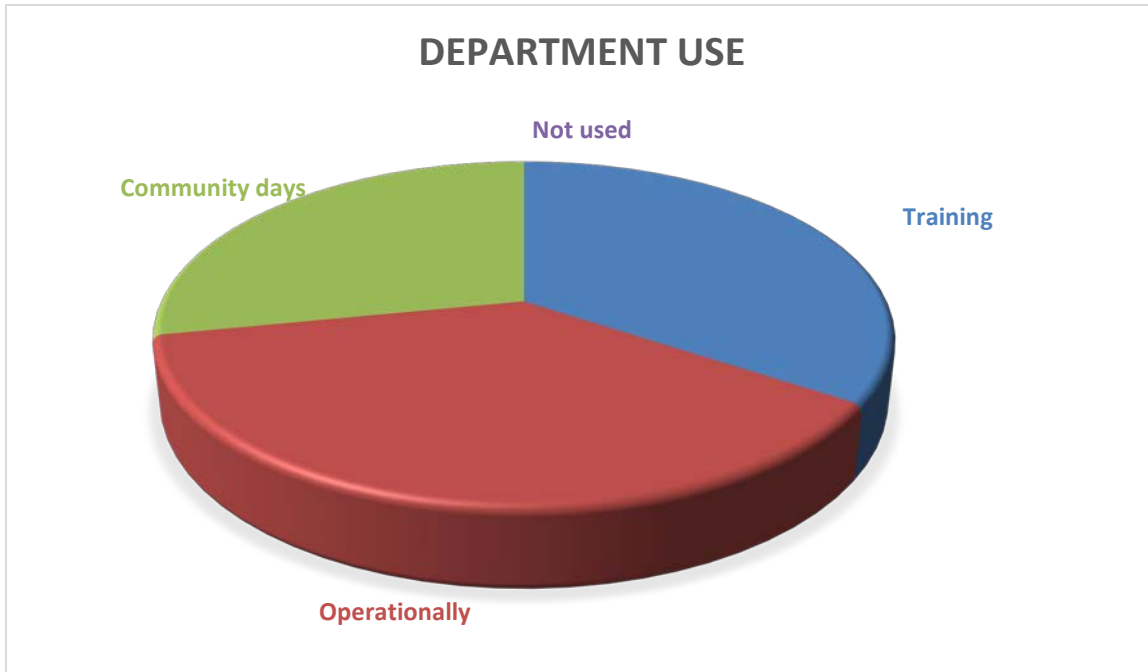
Question five asked respondents how they acquired their robotics platform, either through various grants or if it was a department purchase. Eight indicated they were obtained by grants of various sorts but department purchases at six were nearly as high. No department indicated that they used the Military 1033 LESO program to obtain robotic platforms.

- Federal Grant – 6
- Local Grant – 1
- Private Grant – 1
- Department Purchase – 6
- Military Surplus program – 0



Question six asked in what capacity the departments used robotics. None indicated that they have not used them in some manner. The majority answered that they have primarily used them in training and operations with less stating that they have participated in community days.

- Operationally – 12
- Training – 11
- Community Days – 9
- Not used - 0

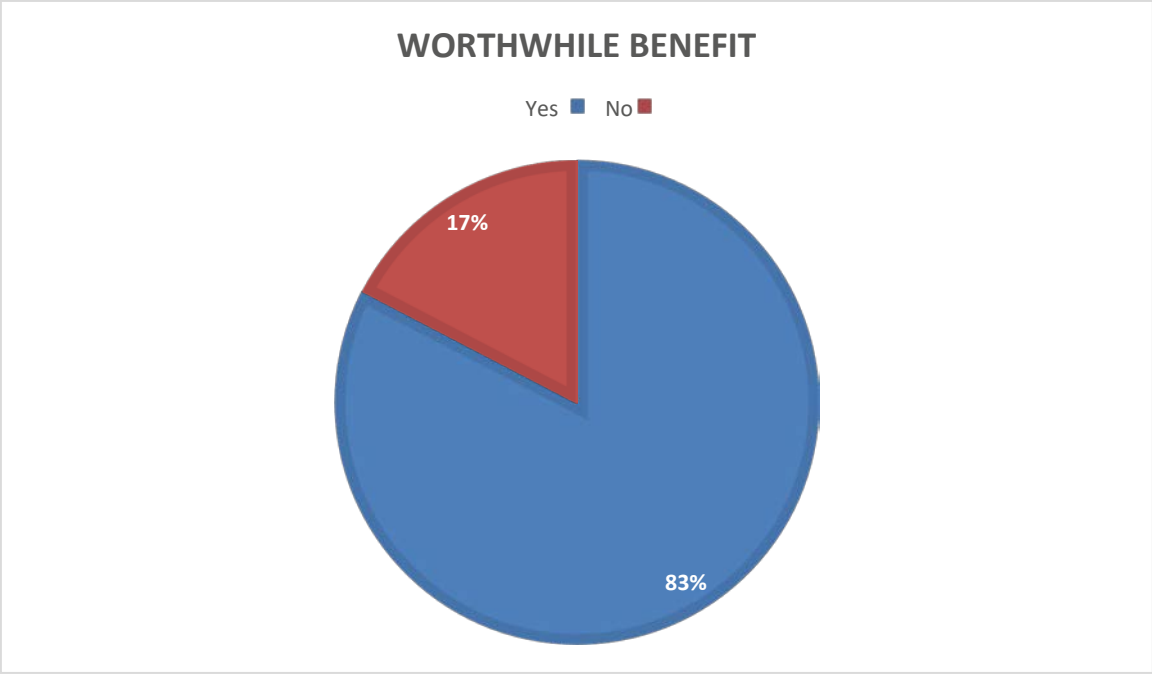


Question seven asked if they planned to expand the program in the future. Nine respondents indicated that they have plans to expand their program in the near future and four indicated that they did not.

For those that said they did not have a robotics program in place, after question one they were sent to question eight to determine their intention to start a program and why or why not.

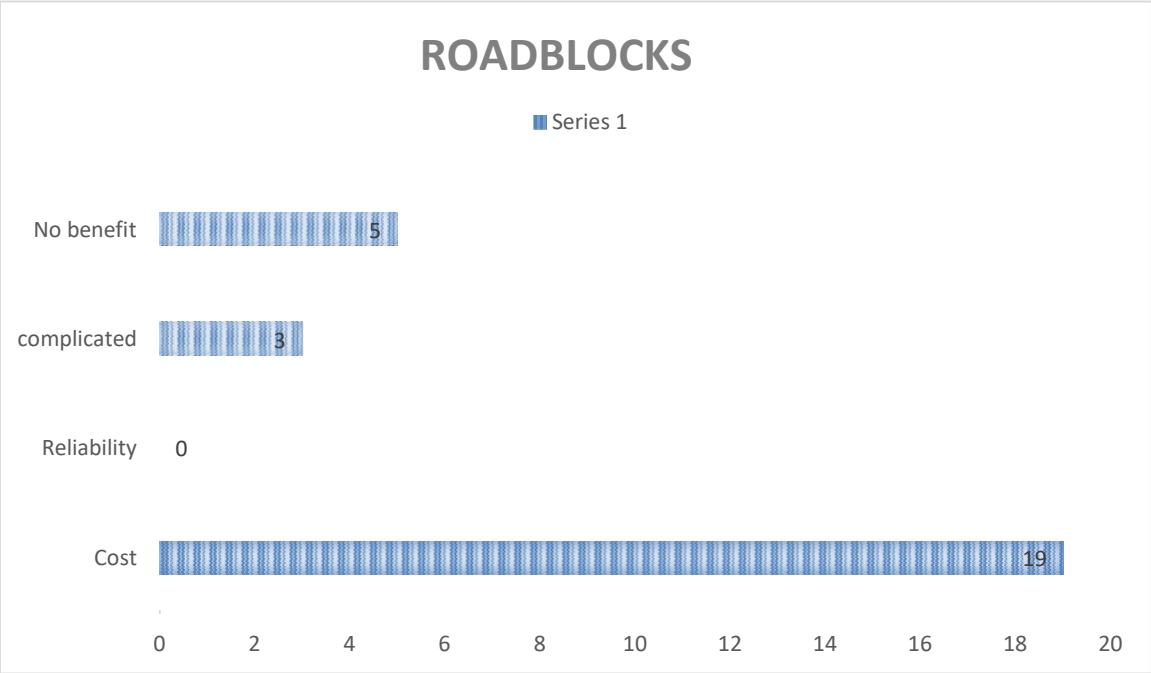
Question eight asked those who said they do not currently have a program if they intended to start one in the near future. Nine of the twenty-three who responded that they did not have a program indicated that they plan to start one in the near future, the other fifteen indicated that they did not.

Question nine was asked to determine if those that did not currently have a program thought a robotic program was worthwhile. The overwhelming majority (19 of the 23) surveyed said that it would be a benefit to have a program in place. Four indicated that they believed it would not benefit their department.



Question ten was to determine the roadblocks these agencies faced while attempting to start a robotics program. They were asked to check all that apply. Cost as indicated by 19 respondents was the major factor.

- Cost (initial and sustainment) - 19
- Do not feel it would benefit the department - 5
- Too complicated - 3
- Unreliability – 0



## Discussion

The results indicated that though the majority of agencies did not have a robotic program in place, they overwhelmingly felt a program would be a benefit to their department.

The response by some agencies that indicated that robotic technology would not benefit their department may have been due to the random sample was taken from all law enforcement agencies in the state, regardless if they were a “first responder” agency or not. As a result, some State Attorneys and School Board police were included in the sample. The results would have benefited from inclusion of “first responder” agencies only, as it would compare apples-to-apples.

There were some interesting facts about the data I was not expecting, specifically why three agencies in group one had robotics, being the lowest number of officers per agency but no agencies in group two had robotics. I expected that all smaller departments would be less represented due to their presumably tighter budgets. The survey did not consider the location of the departments, population size or their annual budgets which may have been a significant factor. As expected, all but one of the larger agencies have a robust robotics program in place.

Some departments indicated that though they did not have robotics, they did have access to the technology through mutual aid or other agreements with nearby agencies.

Drones appear to be the dominate player in the quest for robotics now and in the foreseeable future. As they become more commonplace and the advancements continue, there is hope that the technology becomes more affordable, which would allow the departments with tighter budgets the opportunity to start a program.

Drones are a good place to start entering into automation. They can be utilized in multiple situations and offer an overhead perspective on crime scenes, crowd control and could assist in locating missing or fleeing persons. Drones can quickly observe and cover more area than ground-based platforms, which would allow law enforcement to focus on areas of immediate concern. They would also act as a force multiplier and reduce the amount of personnel needed on each scene, which allows the agency to be more efficient.

As drone technology improves many of the older models get replaced by departments. Some of these may be early models or off-the-shelf recreational drones but they can still accomplish the mission. If nothing else, it would give an agency the opportunity to evaluate the idea to determine if it should be a spending priority.

Additional options for ground-based automation are becoming available for purchase or on a lease agreement. Coupled with advanced software they could be used to enhance current closed circuit tv surveillance. Another benefit would be adding a visual deterrent to areas of large concentrations of people or placed in local “hot spots” to deter further criminal activity, where the instillation of a complete surveillance system would be too costly or unnecessary to correct the problem quickly. Ground robotics could interact with suspects or victims immediately until a uniformed officer arrives, which would be a huge benefit over a standalone surveillance system.

Robotics technology potentially opens up opportunities for the public to report crimes to law enforcement that otherwise may not have the opportunity or ability to get involved. Disabled military veterans who have experience working with advanced

technology in their prior duties but who are unable to physically perform as a street officer could potentially control a remotely operated robot to assist the officers in the field. Different opportunities include working with robotics with advanced detection capabilities or the ability to be an extra set of eyes watching for danger while the officer performs tasks that divert their attention.

Law enforcement has a history of not “showing their hand” to the community but in the case of advanced technology, more exposure through citizen events could have a significant return on investment. Given the opportunity, agencies could demonstrate the benefit to the community and allay fears that it is intended to oppress. Agencies should hold these type of events upon acquisition of the equipment to show transparency and to educate the community they serve.

## **Recommendations**

Several opportunities exist for departments to start working towards a robotic program. Many agencies who have had a program for several years have upgraded to newer models and thus have the old ones sitting on the shelf that they may be willing to surplus to another agency.

Explosive Ordinance Disposal (bomb squad) robots continue to have a very narrow focus of use for departments, epically due to their generally high initial price-point. EOD robots are taken out of service when new technology make them less efficient for their intended purpose and could be repurposed by other areas. Many of these are well maintained, just older. Several models can be obtained through the military LESO program and with little money, compared to purchasing new, can be retrofitted to use as SWAT robots or sent ahead for surveillance or negotiation during dangerous situations.

Federal and state grants are available to departments and are under utilized by departments. Often the grant process is tedious but those that are willing to learn the process can secure funding for advanced technology for their departments.

Another way to begin a program is with entry level recreational drones. Many of these produce high quality camera footage and good response for a few thousand dollars start-up.

Law enforcement leaders should lobby their state representatives to start drafting laws to guide the implementation of technology advancements and allocate funds to perform a feasibility study into the potential cost and benefit of investing in robotic technology in the field of law enforcement.

Local jurisdictions could initially split the cost of robotic purchases across areas of potential need, specifically drones. They could partner with public works, property appraiser’s office, tourism development or the fire department to purchase the equipment with the agreement that if needed the local department would provide the platform for their use.

Law enforcement needs to encourage community days or other events with honest answers on its intended use of evolving technology which can be helpful to a robotics program and increase support in the community.

More widespread education and training opportunities through local collages or

law enforcement training academies would be useful to encourage traditional minded command staff members to consider the integration of robotics. Advanced studies in law enforcement technology will have added benefit of drawing employment interest to law enforcement from members of the public who had not previously shown an interest. Many military members who were trained in technology but have no desire to wear the uniform could feel comfortable in the law enforcement command structure they are familiar with but could continue to work in the field they have a passion for.

Lieutenant Anthony Cauley has been with the Florida Department of Law Enforcement Capitol Police since 2000. He currently serves as the Bomb Squad Commander and Lieutenant over the Training Section, to include Field Training Officers. He has served as a deputy in patrol for Clay County Sheriff's Office beginning in 1997 prior to moving to Tallahassee and working for Capitol Police. In 2003, he was promoted to the rank of Sergeant and served in Patrol, Training, and Special Operations. In 2013, he was promoted to the rank of Lieutenant and served in Patrol, Special Operations, and Training.

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## Appendix A

### SLP survey questions

1. Does your agency currently have any robotic platforms? (Drones, Tac-bot, EOD robot or other)
  - Yes
  - No
  
2. What type of robotic platform does your agency have? (check all that apply)
  - Drone
  - Tac-Bot
  - EOD robot
  - Patrol bot
  - Other
  
3. How many years has your agency had a robotics program?
  - No more than 5 years
  - 1 to 5 years
  - 5 to 10 years
  - More than 10 years
  
4. Do you feel your robotic program is a valuable asset to your department?
  - Yes
  - No
  
5. How were your robots obtained? (check all that apply)
  - Federal Grant
  - Local Grant
  - Private Grant
  - Department purchase
  - Military LESO program
  - Other
  
6. How have you used robots in the past? (check all that apply)
  - Training
  - Operationally
  - Community events (kids days, etc.)
  - Have not used it yet



7. Do you plan expand your robotic program in the near future?
  - Yes
  - No
  
8. Do you plan to start a robotic program in the near future?
  - Yes
  - No
  
9. Do you feel a robotic program would be a valuable asset to have for your organization?
  - Yes
  - No
  
10. What is preventing your decision to start a robotic program? (check all that apply)
  - Cost (initial and sustainment)
  - Unreliability
  - Too complicated
  - Do not feel it would benefit the department