IT / Tech Issue 2019

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LETTER FROM THE EXECUTIVE DIRECTOR

David Bradford,
Executive Director,
Northwestern Center for
Public Safety

WE DEVOTE this issue of *The Key* to technology. In the mid- 1960s, we sat in our living rooms, watching our favorite police shows on TV — "Dragnet," "Adam 12," and "The Andy Griffith Show." Perhaps the most notable police show that featured technology was "Highway Patrol," starring Broderick Crawford as the rough-voiced, fast-talking Captain Dan Mathews, who called "10-4" into the two-way radio of his Buick Century police sedan. The show was filled with criminals being pursued by officers on fast motorcycles and in the powerful Buick V8 police cars with the long "whip" antennae, communicating with each other on their radios.

What parent of that day was not perplexed and dismayed when their children replaced responses of "Yes, ma'am" and "No, sir" with "10-4" and "roger"? America's youth began speaking the language of the 10-Code. I have wondered if this was the forerunner of texting shorthand: lol, BFF, ttyl, etc. In 1964, comic book character Dick Tracy traded in his radio watch for a two-way wrist TV to better communicate with the office. Then, in the middle of this phenomenon, a new event took place. TV screens transported us to "where no man had gone before" aboard the *USS Enterprise* on "Star Trek". Every week Captain James T. Kirk would beam down to an alien planet, and when life-threatening trouble invariably arose, he would flip open his communicator and say "Beam me up, Scotty". Spock and Dr. "Bones" McCoy would wave their tricorders over strange life forms and murmur "intriguing . . ." When waived over crew members, the tridcorders healed every disease and aliment. As the crew of the *Enterprise* teleported, carried phasors, communicated with their computers by voice, and carried data around on little plastic sticks, a new phenomenon was born that social scientists dubbed "the Star Trek Effect." If you show imaginary cool technology in entertainment media, youth will immolate it, and enthusiastic engineers and scientists will strive to make it a reality.

The successes of those inspired men and women are evident in the innovations we see being deployed in today's policing agencies. Yesterday's fiction has become today's reality, and it gives us pause to think about what policing technology awaits us in the future with the continued development of Artificial Intelligence, Robotics, and Virtual Reality. Perhaps Robo Cop is near, and Minority Report is not that far in the future.

With all of the technology advances and changes brought to policing, one element remains constant, the Human Dynamic. Policing is a one-on-one human experience and business that involves all of the conditions of human existence. As long as humans exist in a society or social environment, policing will be present and performed by humans, regardless of what the tools are or how they change.

Leadership Matters — That's Why You Are Here

Chief Kenton Rainey, University of Chicago Police Department
Keynote Address, SPSC Class #448 Graduation,

GOOD AFTERNOON. I am truly honored to be with you today for the graduation ceremony of Class #448 from the Northwestern University Center of Public Safety, School of Police and Staff and Command.

The 30 of you who are mid- and upper-level managers, who hail from various law enforcement agencies from several different states, have been together for the past 10 weeks in order to complete all the rigors and requirements of this prestigious program and to earn your place alongside the 10,000 other public safety officers from around the world who came before you. You have been specifically identified by your agencies as current leaders who will take your departments towards their envisioned futures. This course is designed to provide you with additional skills, knowledge, and abilities to assist in this journey. A review of the course content reveals instruction in resource management, employee relations, strategic planning, media and community relations, change management, and most importantly, leadership. . . .

Continuing Law Enforcement Issues

I been asked to join you today and share my views on current issues in law enforcement management. Next year will be my 40th year in the profession, and as I enter the twilight of my career, I often find myself reflecting back to . . . when I entered the profession. I remember working as a young jail deputy before being given an academy date. I was charged with dispensing prescription medication to inmates who had physical and mental ailments; our squad car was a Chevy Nova; and, I was issued a Smith & Wesson Model 66 357 Magnum revolver as my duty weapon because the department had moved away from the 38 caliber revolver. Prevailing thought throughout the profession at the time was that officers needed more lethal firepower. Do you think that concept would be considered today?

Yes, that was one of the issues at the time. But **two**

> " *Leadership in your organization is like blood in your body, gas and oil in a car or machine, and water to our planet. If there is not sufficient quality and quantity, then "things don't work right." [W]hen any organization . . . suffers from a leadership deficit, people will leave — but more importantly new people definitely won't come. Leadership matters, and that's why you are here.*

distinct law enforcement management issues stood out and were openly discussed: one, the pressure to attract, hire, and retain quality people; and two, growing public scrutiny.

Fast forward to today. We are working in highly technological and digital environments and are grappling with the privacy issues associated with body-worn cameras, facial recognition technology, aerial drone usage, and CCTV systems. Along with that, we must ask if we have properly prepared and equipped our personnel to respond to active-shooter threats, when many times the suspect suffers from some type of mental illness.

As I previous mentioned, I am entering my 40th year in the profession. I have worked in seven law enforcement agencies in four different states, which include county, municipal, airport, transit, and now a university police setting. In my travels, **two distinct law enforcement management issues continue to stand out: one, pressure to attract, hire, and retain quality people; and two, growing public scrutiny.**

Now, many have opined the reasons why these two issues continue to challenge the profession. I am sure this has been a topic of discussion in some form or another during this program. The Police Executive Research Forum recently held a conference with law enforcement leaders from around the country to address the issue of attracting, hiring, and retaining

quality people. The consensus was that, yes, this was a widespread problem and increased public and media scrutiny — made possible by technology and social media — was having an exasperating impact on recruitment. From my perspective, these issues are related or interdependent. You don't have one without the other.

Last month I paid my respects at two officers' funerals. Ventura County (CA) Sheriff's Sergeant Ron Helus was killed in Thousand Oaks at the Borderline restaurant. Chicago Police Officer Samuel Jimenez was killed at Mercy Hospital. Both died responding to active shooter incidents. *Tragic.* I continually ask myself, *How and where do we find heroes like these two to join our ranks?*

Also last month, in Robbins, IL, a security guard who was detaining a suspect was killed by responding police; and at a mall in Hoover, AL, police responding to a shots-fired call shot and killed a man who was not the gunman. I am not judging either incident or implying something was done wrong because I don't know. I **am saying that the public is judging us, and they don't like what they are seeing.**

So why do these two issues continue to challenge us? I feel these issues continue to come up because we are not taking time to ensure we are properly investing in our most important resource, which is our people. This investment takes place through our leadership. Who we attract, hire, and retain is a direct result of the collective leadership that is being provided within our profession.

In today's ever changing world, no law enforcement management issue cannot be solved when you have the right people in place who are being properly led. **Make no mistake, leadership matters. This is why you are here** — to discover, develop, refine, and/or reignite your leadership style. Leadership in your organization is like blood in your body, gas and oil in a car or machine, and water to our planet. If there is not sufficient quality and quantity, then "things don't work right." More importantly, when any organization or profession sufferers from a leadership deficit, people will leave — but more importantly new people definitely won't come. **Leadership matters, and that's why you are here.**

Wednesday, December 5, the importance of leadership played itself out during President George HW Bush's funeral. During his services, you had five

Chief Rainey (center), NUCPS Executive Director David Bradford & Deputy Director Shelly Camden. | Photo: C. Andrew

other living US presidents in one place, but two very distinctly different leadership styles were on full display: transactional and transformational. I borrowed some language from two leadership authors to describe the two styles:

Transactional leadership relies more on a give-and-take understanding, whereby subordinates have a sense of duty to the leader in exchange for some reward. The leader uses disciplinary power and an array of incentives to motivate. . . . A transactional leader does not look ahead strategically to guide the organization forward. This leader is most concerned with maintaining the normal flow of operations.

Transformational leadership involves a committed relationship between a leader and followers. The leader values creativity and autonomy among their followers and supports their followers' efforts to be as creative and innovative as possible to identify solutions. The transformational leader has a willingness to take risks and follows a core set of values, convictions, and ethical principles in the actions taken. This is how the leader builds trust with the followers and the followers, in turn, develop confidence in the leader.

Without getting into politics, I will let you decide what type of leader President George Herbert Walker Bush was, but more importantly, what type of leader

you should aspire to be. . . . When you return to your organizations, which type of leadership does your multi-generational work force want and need to be successful and to thrive in the 21st century? **Leadership matters, and that's why you are here!**

Now, maybe some of you are thinking, *I am only a detective, a sergeant, or lieutenant — not the Chief. What can I really be expected to do? What difference can I make?* Here are a couple of things I want you to remember:

• Leadership is not positional. You may not be the chief and may not have the ability to make large-scale leadership decisions that can have a great organizational impact. However, each of you has the ability to make small-scale leadership decisions within your individual work units in a great way that still have an important impact.

• All leadership involves the acronym **VICTORY.** No matter if you are a religious, military, political, or law enforcement leader, your leadership style has to inspire your followers to achieve a VICTORY which usually involves moving towards a better future:

> Your **VALUES** inspire your vision;
> Your **INTEGRITY** drives decisions;
> Your **COMMUNICATIONS** foster transparency;
> Your **TRUST** encourages creativity;
> Your **OPTIMISM** brings hope;
> Your **RELATIONSHIPS** matter: easy on the people but hard on the issues; and,
> **YOU** have to come to work every day with the courage to lead by doing all of these things.

If you do this, it will inspire others in your organization to strive to do the same. Then the problems attracting, hiring, and retaining a quality workforce will not be as daunting, and "public scrutiny will begin to turn into public support from all communities that we serve."

As you depart from each other and return to your agencies, remember those who came before you and what both you and your agency sacrificed for you to complete this program.

Leadership matters, and that's why you were here. §

— December 7, 2018, Skokie, Illinois

Recruiting Tomorrow's Leaders with Today's Technology

Law enforcement is notorious for its lengthy hiring process. The application process can stretch out for as long as 18 months. Low unemployment, such as December's 3.9% (Bureau of Labor Statistics, Dec. 2018), only increases the difficulty of recruiting qualified law enforcement candidates in an industry already plagued with few applicants.

In such an environment, agencies are destined to lose qualified candidates who need to earn a living. According to investigative technology expert Kenneth Coats, a 2013 independent survey reported that 11,000 rookie applicants dropped out of the law enforcement career path because "they simply lost interest" during the application process.

Coats emphasizes employing technology to shorten the time-to-hired process. Large agencies' recruiting efforts may benefit from platform-based software that automatically collects and streamlines candidate data from online applications, background checks, test results, and more.

He also suggests utilizing tech-driven communications apps to attract, engage, and retain preferred candidates. The following are a few of his common-sense, budget-friendly suggestions:

• Use social media to attract candidates and to keep them excited about your agency. Frequent posts on Facebook, Twitter, and Instagram are investments in community relations as well as recruitment.

• Develop an automated email program to regularly contact and engage applicants throughout each stage of the hiring process. Consider including agency news and hiring information and answers to FAQs.

• Take advantage of easy-to-use apps to create online videos that emphasize "the higher ideals of law enforcement," showcase your agency, and feature your staff.

• At the very least, clearly communicate the hiring process on your agency's website. §

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APPROACHING INFORMATION SECURITY:
Different Assessments Answer Different Agency Needs

by Chris Cronin, ISO 27001 Auditor, HALOCK Security Labs

Leadership in all types of organizations, including law enforcement agencies, is coming to understand the critical role that information security plays in successful operations. Most organizations need a combination of security assessments to understand their security vulnerabilities. By clearly summarizing the variety of security assessment options available, this overview helps answer the question: *What kind of security assessment does my agency need?*

Gap Assessments and Audits

Gap assessments and audits are used for different purposes, but they involve almost identical analysis and share the same limitations. Unfortunately, they are frequently misused to plan corrective actions.

What They Are
A *gap assessment* or *audit* is a comparison that determines how well an agency's security practices match a controls list. A controls list may come from a published security standard, such as ISO 27002, NIST SP 800-53, PCI-DSS, or the CIS Controls. Outside auditors or regulators may provide their own controls list for an assessment or audit. In corporate America, vendors often are given their clients' or customers' required controls lists to use in assessments or audits. An audit is a little different from a gap assessment in that an independent professional performs an audit to check for compliance to a standard, then reports the results to an authority.

What They Are Good For
Gap assessments and audits are good for determining whether your security practices resemble a standard.

Their Limitations
Be very cautious of gap assessments. Most organizations cannot operate effectively with all security controls completely in place. They are too costly in terms of invested dollars and business constrictions. As a result, a competent gap assessment or audit will always result in identified gaps. Similarly, these tools can't tell you if the identified gaps are acceptable, nor can they identify the reasonable safeguards that should be used given your agency's unique circumstances and risks.

What Decisions Do They Help Management Make?
Use gap assessments and audits to identify potential security vulnerabilities to your information, facilities, people, and systems. However, use the following

Which Security Assessments Should Your Agency Consider?

Since no single assessment can offer a complete picture of your security posture, this matrix can help you identify the mix of security assessments that best address your agency's needs. To do so, ask the questions in the Need column and select the set of assessment methods that best answer those questions.

Routinely repeating assessments offers full situational awareness. Because the optimal assessment mix may change over time, agencies should regularly use this table to help review their needs.

Need	Gap Assessment / Audit	Risk Assessment	Vulnerability Scan	Penetration Test
How well do our security policies align with a standard?	✔	✔		
How compliant are we with regulations or standards?	✔	✔		
How secure are we against foreseeable threats?		✔	✔	✔
How secure are we against current threats?			✔	✔
What security investments should I make now?		✔	✔	✔

risk assessments to determine whether those vulnerabilities matter, assess the risk that they pose, and plan for their improvement.

Risk Assessments

Risk assessments are required by laws, regulations, or standards for determining when security controls are reasonable and appropriate. They help substantiate that an organization is meeting its "duty of care" to secure its information and systems. Regulators, judges, attorneys, and security standards bodies all know that perfect security is not possible, so risk assessments were devised to determine when security safeguards are responsible.

What They Are
Risk assessments estimate the likelihood and impact of foreseeable threats that could compromise the security of information assets. A risk assessor will ask, "This type of asset is often attacked using 'X' threat. Given your safeguard, what is the likelihood and impact of this threat?" Your answer may indicate whether a risk level is reasonable with the current safeguard in place or that a new safeguard is warranted. Risk assessments demonstrate due care when planned security improvements reduce risks

to an acceptable level and their burden is no greater than the risks against which they protect.

Multiple information security risk assessment methods — such as ISO 27005, NIST SP 800-30, FAIR, and RISK IT — support this analysis. CIS RAM (Center for Internet Security® Risk Assessment Method) is free to the public and provides step-by-step instructions and templates for completing these assessments.

What They Are Good For
Risk assessments are useful for managers to determine whether current or planned safeguards are appropriate and how to prioritize improvements; higher risks should be addressed first. Assessments provide a good basis for budgets and an excellent explanation to auditors about the appropriateness of controls. If a breach does occur, risk assessments are good demonstrations of due care.

Their Limitations
Risk assessments are estimations of what may happen. Unless they are paired with penetration tests or vulnerability scans, they do not give you a good picture of how hackers and malware may be compromising systems right now.

What Decisions Do They Help Management Make?
Managers can prioritize their investments in security based on the risk reduction value of each safeguard or the likelihood of a foreseeable impact. If the risk assessment and acceptance criteria are appropriately defined, then managers may also be able to safely say, "Our current safeguard is enough."

Vulnerability Assessments

When analyzed against well-defined risk criteria, a vulnerability assessment can provide excellent input into an agency's risk assessment.

What They Are
Vulnerability assessments or *vulnerability scans* are technical evaluations of systems performed with the goal of detecting vulnerabilities that hackers, users, or malware may exploit. Sophisticated software applications run scans that search a network for an agency's systems, services, and applications; then, test each for the security weaknesses cataloged in the application. Reports reveal the vulnerabilities on each system and prioritize them based on a variety of conditions, tests, and criteria.

What They Are Good For
Vulnerability assessments will quickly reveal the weaknesses that hackers or malware could exploit.

Their Limitations
Vulnerability assessment reports will often use the term *risk* to describe their estimations of the ease of attack or potential harm that a vulnerability can pose. Their definition of *risk* will likely not be yours. These reports do not take into account how accessible the system is or what actual harm can result from a successful attack. Further, "low-risk" vulnerabilities may actually pose a high risk to your agency, due to the harm that your organization could suffer.

What Decisions Do They Help Management Make?
Vulnerability assessments can indicate a number of weaknesses that you may decide to address immediately. Be cautious about over investing in low-risk vulnerabilities or accepting vulnerability risk that could be high impact if a breach occurs.

Penetration Tests

Penetration tests step beyond vulnerability scans, exploiting vulnerabilities and escalating them to see how far attackers can get through an organization.

What They Are
Penetration tests (*pen tests*) are attempts by white hat hackers to exploit systems, applications, facilities, and networks to determine what harm hackers or thieves can do. Pen testers use a combination of technical and physical tools, scripts, and manual processes to systematically explore, exploit, and escalate vulnerabilities. Testers provide reports that describe what was tested and what they were able to see and do.

What They Are Good For
Pen tests provide agencies with the best demonstration of the harm that hackers can do in the current state. Their reports should include recommendations for preventing similar exploits by actual attackers.

Their Limitations
Pen tests demonstrate what the testing team was able to discover within an agreed scope. Tests that are not scoped to include social engineering or physical attacks will miss the common weaknesses that cause data breaches, including employee error and poorly handled media. Similar to gap assessments, audits, and vulnerability tests, pen tests only provide an indication of the acceptability of risks if done in conjunction with a risk assessment.

What Decisions Do They Help Management Make?
When leadership sees the vulnerabilities that attackers can see and understands the harm that hackers can do, it can take specific action to close those vulnerabilities.

If management goes further and considers the root cause of a vulnerability, it can reduce the likelihood that the vulnerability will re-occur. Keep in mind that regulators and attorneys ask compliance and foreseeability questions on a regular basis and that hackers answer those questions when you least expect it. §

Five Common Barriers to Strategic Change: A Police Leader's Overview

The Overcoming Barriers to Change Series, Part 1.

by Joseph Fitzgerald, PhD

*This is the first installment in **The Key's** six-part series, Overcoming Barriers to Change. This practical overview addresses change management vis-a-vis five common barriers to successfully implementing change in law enforcement agencies. Subsequent articles will examine each barrier individually.*

ALL TOO OFTEN law enforcement leaders bring forth ideas on how to strategically move an agency's mission and vision forward, only to see those concepts fizzle out in the early stages of planning or implementation. Why is this? Despite the importance of strategic planning and how it may affect an organization, agency executives may face serious difficulties when it comes time to implement their agency's plans. (Miller)

Strategic plans do not implement themselves, and leaders must anticipate barriers to both the plan and subsequent implementation. (Grigoroudis) The University of Johannesburg's C.J. Jooste and Barend Fourie note that "strategy implementation, rather than strategy formulation, is the key to superior organisational performance. However, the high failure rate of strategy implementation efforts is well documented, and many barriers to effective strategy implementation exist." (Jooste)

From a practical standpoint, most organization members tend to believe that the following five conceptual barriers are important when dealing with change as it pertains to their own perspectives within their organization. (Sung) Because these barriers have similarly weighted values between employees in various agency roles and positions, once they are identified and understood, they can help management facilitate change as it occurs in accordance to an administration's strategic plan. (Moss) Identifying and carefully managing the following critical areas associated with change can provide police leaders with a clearer direction and an increased likelihood of successful project implementation.

Barrier # 1: Undefined Vision Can Lead to Confusion

A strong, unified vision is the key to agency leadership successfully communicating what the future holds in store for its organization. Clearly addressing the direction in which leaders envision their agency heading delivers a strong message to employees. As a leader, your strategic vision can create hope and excitement for your employees. However, an organization without a well defined vision, or any vision at all, generally operates in a confusion and expends needless energy trying to get somewhere — only to realize that the somewhere it was going was changed to somewhere else. Neglecting to communicate elements of a strategic plan to employees — and their consequential lack of awareness of an agency vision — present a noticeable barrier to any organizational change. (Jooste) Instead, a clear, strong vision can induce critical dialogue at all levels, reduce confusion, and provide the needed buy-in and motivation to move change forward.

Barrier #2: Lack of Resources Can Lead to Frustration

Properly allocating such resources as employees, equipment, time, and funding is important because they help support and maintain the structure and operational ecosystem of an organization. (Brenes) A lack of required resources can hinder or delay project implementation or completion and, in certain cases, can prevent a project from occurring at all.

TABLE 1 *offers a visual representation of the different barriers to change and the emotions that can result. Notice that a missing element often results in a commonly associated emotion among employees — emotions that hinder change and completion of a strategic plan. For example, if an agency has no clearly stated vision, but all other elements of change are in place, confusion is likely to exist. This matrix is a useful tool for quickly identifying areas that should be addressed and reflecting upon how to adjust these issues and reactions in order to move forward with strategic plan and goals.*

Results of the 5 Barriers to Strategic Success

Vision	Resources	Skills	Incentives	Action Plan		Results
✗	✓	✓	✓	✓	→	Confusion
✓	✗	✓	✓	✓	→	Frustration
✓	✓	✗	✓	✓	→	Anxiety
✓	✓	✓	✗	✓	→	Resistance
✓	✓	✓	✓	✗	→	Treadmill
✓	✓	✓	✓	✓	→	**SUCCESS**

Table 1

Law enforcement professionals are aware that a good proportion of their work is mission critical, and resource shortages can significantly impact their ability to carry out their duties. Inadequate funding, a scarcity of needed equipment, and insufficient staff lead to less time to do more work, and frustration is one of the most common results. When frustrated, one tends to make rash decisions, which could potentially create a situation that compounds the original issue rather than addresses and solves it. From this perspective, strategic plans that do not take into account already overburdened staff or that do not properly equip staff for change will only increase resistance to change in the form of frustration, rather than helping employees identify the benefits of change and willingly work toward the realization of short-term goals.

Barrier #3: Inadequate Skills Can Cause Anxiety

In a constantly evolving 21st century, all types of businesses and organizations encounter — and must adapt to — rapid technological and environmental changes. Despite this, when developing plans for organizational change, leadership often overlooks the details of the associated skills that their individual employees may or may not possess in regard to a new role or expectation. (Strauss) Not possessing the appropriate skill sets to deal with changes to technical, logistical, or administrative duties within an agency can produce anxiety among officers and staff: *I don't know how to do X. Will they train me? Am I expected to learn X on my own? It sounds complicated. I haven't ever done this before.* Eventually this anxiety becomes resistance in the form of avoidance. Ensuring that through continued education and training your employees are prepared to skillfully deal with technological, cultural, and managerial changes to their specific roles can eliminate unnecessary anxiety and move your vision successfully forward through critical periods of change.

Barrier #4: Absence of Incentives

An unmotivated workforce can pose a problem for administrators who are implementing strategic plans. (Brenes) Incentives are powerful change management tools that can be employed in the struggle to motivate employees. Depending on their values and goals, employees may be motivated by the opportunity to obtain some form of immediate or short-term gratification. (Ersner-Hershfield) One could

argue that tangible incentives such as a raise or bonus are motivating, but for those of who work in the public sector, these financial incentives either are not an option or do not occur on as frequent a basis as they do in the private sector. A lack of incentives when conducting change can lead to resistance.

While raises and bonuses are tangible incentives, motivation can also be generated through intangible incentives. What most police executives have at their disposal are opportunities for individuals to grow within a professional capacity. Individual employees who have an incentive to develop themselves tend to do their job well and are more inclined to critically evaluate their own performance. (Saif) This also challenges them to frame their role from a symbiotic perspective in relation to the overall organization. Identifying incentives that motivate employees can be challenging but, if done correctly, can counteract any potential resistance to change and yield benefits for the organization.

Barrier #5: No Action Plan in Place

Change leaders who lack a plan for managing a project from start to finish will generally experience major obstacles to their strategic plans. Having no implementation plan in place can cause a treadmill effect: Valuable time and energy is expended "moving forward;" however, no demonstrated milestones can be marked off as complete, and the lack of this roadmap can compound the confusion, anxiety, and frustration associated with the other barriers to change. Eventually leadership will realize that it has not moved any closer to its stated vision. To avoid this problem, police leadership should develop action plans for those projects that will move the agency toward its vision. These plans should clearly define and prioritize projects and focus on specific project goals and the actions required to reach those goals. (Murphy) Action plans not only complement the organizational vision but also provide steps for an organization to follow as it navigates change.

Conclusion

Despite the importance of strategic planning and its critical impact on organizational goals and projects, managers sometimes face serious difficulties implementing strategic decisions. (Miller) Police leaders should take the time to review their current initiatives for any potential barriers to progress. §

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Strengthening Police-Community Partnerships through Community Partnership Diagnosis & Action Planning

by John Furcon
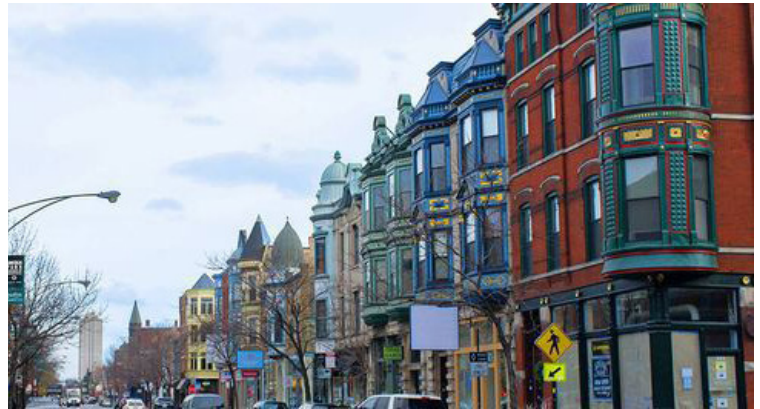
TO BETTER ADDRESS the enduring challenge of strengthening police-community relations, NUCPS developed and piloted a community diagnostic and action-planning process to assist law enforcement agencies in building quality of life in their communities. Defining community structure via 16 types of institutions, the process involves identifying key leaders and stakeholders, and evaluating strengths and risk factors in each institution. The process also presents a methodology for promoting collaboratively developed objectives and plans for improving institutional effectiveness and quality of life. This article outlines the components and implementation dynamics of the process and summarizes the lessons learned from an initial application of the process in a major suburban police department.

Community Partnership Model

The combined efforts of community institutions impact quality of life. *Figure 1* identifies four major categories of institutions that define a community and are the source of leadership, communication, and relationships among key stakeholders who mobilize resources to build quality of life. *Figure 2* (page 13) identifies the 16 institutions that are included in these categories.

Community Diagnostic and Action-Planning Process

The first step in the community diagnostic and action-planning process is the identification — and assessment — of the level of positive relationships with the leadership in each of these institutions. These key stakeholders, who include opinion leaders, influencers, and decision makers, have a compelling power and interest in their community.

In practical terms, this step involves listing the major organizations within the institutional category, identifying key stakeholders, and characterizing the nature of the relationship between the police agency and the stakeholder. For example, in the category Faith-Based Organizations, this would involve identifying the pastor, rabbi, or imam for each congregation, and then evaluating the nature and quality of their relationships with the police agency. Through this key stakeholder analysis, the current state of the community relationship network is defined.

Figure 1: Institution Categories, Community Partnership Model. | © 2016 NUCPS

The second step in the diagnostic process is evaluating each institution's current status in

contributing to quality of life in the community. We have developed a set of diagnostic indicators to help define the level of soundness or risk for each institution. *Figure 3* (page 14) presents a list of representative indicators of strengths and risks for Education. As an example, *Figure 4* (page 14) contains actual findings, which led the analyst to give the sample institution a rating level of "0" on a three-part scale of "+, 0, or -."

By contrasting a community's indicators to the diagnostic standards, a police agency is better able to diagnose the situation, understand the needs and readiness for improvement of community partnerships, and set better-informed priorities.

The final step in the diagnostic process involves determining which institutions should receive the highest priority for attention and action. Ideally, the existence of positive relationships with key stakeholders coupled with levels of risk and readiness for improvement leads to dialogue, identification of mutually-desirable objectives for the institution, and continuing support from the police agency as the institution moves forward.

Application of the Process

Example

Serving a community of approximately 75,000 people, the Evanston Police Department (EPD) is a typical example of a suburban agency located adjacent to a major city and in a densely populated urban area. EPD's unique factors include: Northwestern University is located within the confines of the city; and, since as early as 1985, EPD has focused on police-community relations through its dedicated Police-Community Relations (PCR) unit, which is assigned across nine aldermanic wards. At present, PCR is staffed with eleven officers and two supervisors. The Fifth Ward historically absorbs the highest percentage of police resources and is served by four PCR officers, two of whom are regularly assigned to foot patrol in the ward.

Example Process

The diagnostic and action-planning process was implemented in the EPD in five steps:
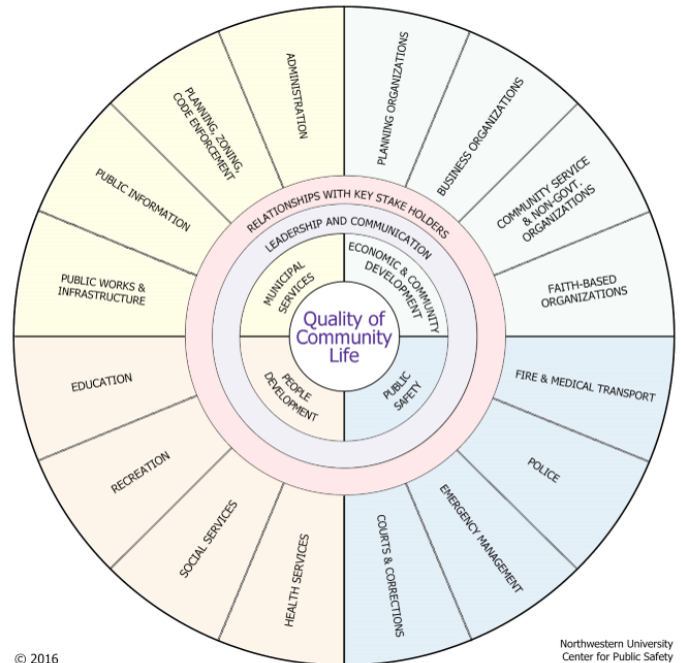
Figure 2: Category Institutions, Community Partnership Model. | © 2016 NUCPS

1. All PCR officers and supervisors received initial training in the use of the process;
2. NUCPS staff coached officers and supervisors in the application of the process, with particular emphasis on the Fifth Ward;
3. NUCPS staff and PCR unit members presented an in-depth progress report to all EPD supervisors and managers;
4. Based on growing experience with the process, focus shifted to coaching officers assigned to two or more typical main street-type wards in the application of the process; and now,
5. PCR members continue to use the process and application, without further direct involvement with NUCPS.

Among the many action plans that PCR officers have provided and implemented, the following sketch provides a summary of how the process can lead to successful action. A PCR officer assigned to one of the Evanston wards adjacent to Chicago learned of a bar on the Chicago side of a border street that was a frequent source of complaints from Evanston and Chicago about fights, public urination, and noise. Working with business and homeowner organizations and reaching out to leadership of

Diagnostic Indicators

My Community Assessment (rating =   )

Strengths	Risks	Strengths	Risks
• Per pupil funding at or above state average • Strong levels of achievement in annual student mastery testing • 95% or higher high school graduation level • Strong patterns of community involvement and service by students	• Per pupil funding below state average • Below-average levels of achievement in annual student mastery testing • 80% or lower high school graduation level • Significant pre-criminal behavior in schools - bullying, gang activity • Significant criminal behavior in schools - weapons, drugs, assaults		

Figure 3: Representative indicators of strengths and risks, Education. | © 2016 NUCPS

Diagnostic Indicators

My Community Assessment (rating =   )

Strengths	Risks	Strengths	Risks
• Per pupil funding at or above state average • Strong levels of achievement in annual student mastery testing • 95% or above high school graduation level • Strong patterns of community involvement and service by students	• Per pupil funding below state average • Below-average levels of achievement in annual student mastery testing • 80% or lower high school graduation level • Significant pre-criminal behavior in schools - bullying, gang activity • Significant criminal behavior in schools - weapons, drugs, assaults	• Per pupil funding at or above state average • 90% or above high school graduation level • Some athletic teams qualify for statewide finalist tournaments • Well-received DARE program in high school • School liaison officer in high school	• Mixed achievement test results — some schools at 70th %tile of state; others, 40th %tile • High school has gang "wanna-be" groups • Hard drugs & weapons occasionally recovered at high school • Recent problems with sexting in the high school

Figure 4: Actual rating evaluation, Education. | © 2016 NUCPS

nucps.northwestern.edu

the Chicago Police district where the bar was located, the officer developed a strategy to reduce or eliminate the problem. City of Chicago resources were requested to conduct licensing and building inspections, and the bar owners were ordered to appear in administrative hearing to address the complaints and inspection deficiencies. Rather than paying to fix the deficiencies identified in the inspection reports, the owners decided to close the business.

Lessons Learned

The EPD process application verified the benefits of utilizing the community-partnership diagnostic model and also reflected areas for improvement.

- The diagnostic process encourages officers to broaden their scope of consideration as to which institutions and organizations are relevant to their work.
- The process underscores the importance of recognizing and differentiating key community stakeholders.
- Developing a formal, ward-by-ward key stakeholder database with up-to-date contact information is useful for many police department purposes. The EPD is considering adding information on key issues facing each organization.
- The implementation process provides much-improved insight into the nature of the relationships between a department, individual officers, and key stakeholders.
- Gauging the level of strength of positive contribution (or risk for negative contribution) to quality of life in the community was more challenging than expected:
  - Officers had some difficulty evaluating and totaling the contributions of multiple organizations to achieve an overall rating for an institutional component.
  - Officers found it easier to evaluate individual organizations.
  - Use of a "+, O, - " scale did not provide sufficient range for differentiation; a "1-to-10" scale is more productive.

- Implementation resulted in many beneficial cross-institution collaborations and opportunities to improve quality of life in the community through collaborative action.
- The diagnostic process served as a guide for initiating discussions with representatives of community institutions.

Conclusion

The diagnostic process is a way to sum up key stakeholder relationships and balance of strengths versus risks in each community component. Based upon this analysis, and collaboration with key stakeholders, a police department is ready to define its highest priority objectives and strategies to best facilitate movement of the agency and other institutional sectors of the community toward a significantly higher quality of life. §

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FEATURED STAFF STUDY:
Implementation of e-Bike Technology to Replace the Current Fleet of Human-Powered Mountain Bikes within a Growing Downtown Bureau

by John Thompson, Tempe (AZ) Police Department
Submitted May 28, 2018, SPSC Class #437, Scottsdale, AZ

Opportunity

The vision of the Tempe (AZ) Police Department is to keep all who visit and live in Tempe safe from harm. One way in which officers strive to accomplish this goal is through the efficient response to requests for help from the community, including calls for service that originate within the downtown area.

The Downtown / Mill Avenue District currently is comprised of 280 acres, which is slightly less than ½ square mile. (Annex A)[1] Located immediately adjacent to the main campus of Arizona State University, this high-rise urban core is a regional hub of retail, dining, and entertainment options for the tens of thousands of students, residents, and employees who reside in or frequent the area on a daily basis. This downtown district also is the host to a number of events that are important to regional and national interests, including marathons, music festivals, New Year's Eve block parties, art fairs, and collegiate and professional sporting events. Sun Devil Stadium, located in this area, hosted the 1996 Super Bowl.

The downtown district is poised to rapidly expand in size over the next decade (McGlothlin). Within the next three to five years, construction projects currently underway in this area will add thousands of residential units, hotel rooms, and commercial office space. (Annex B). Additionally, a proposed ASU Stadium District expansion will take place over the next 18 years and is expected to virtually double the footprint of the area, adding another 274 acres of land for the bike squad to patrol. (Annex C)

Because of the considerable population density within the downtown district, the most efficient way the Tempe Police Department (TPD) has found to navigate heavy traffic and deliver reliable police service throughout the day is via officers on mountain bike. However, with the expected increases in the geographic size and density of the downtown area, it is incumbent upon the TPD to remain focused on ensuring that technological considerations are given to the current and future needs of the bicycle squad fleet. This study is dedicated to determining if an electronic bike (e-bike) is an effective alternative to consider – now or in the future.

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Assumptions

- Officers assigned to the Field Operations / Bike Squad will continue to be tasked with primary responsibility for the patrol function within this expanding district.
- The TPD will not receive additional staff positions to assist with the proposed expansion of this downtown district.
- Patrol via mountain bike (whether manually powered or e-bike) will continue to be the preferred method of transport within this district.
- The current manually-powered mountain bike model in use is about as technologically advanced as it is going to get (now and in the future), aside from periodic minor equipment upgrades that do not translate to a noticeable change on behalf of the rider.

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Facts

- Approximately 62,000 college students, 20,000 residents, and 30,000 employees currently live in or frequent the downtown community on a daily basis. (Annex D)
- Within the next three to five years, the downtown district is set to expand, adding another 2,370 residential units, 806 hotel rooms, and over

1 All annexes referenced in this study are included with the online version of this study.

Continued →

1,400,000 square feet of commercial office space. (Annex B)

- Within the next 18 years, the ASU Stadium District is set to add another 274 acres to the footprint of the downtown district, including 3,645 residential units, 667 hotel rooms, 298,000 square feet of retail space, and over 4.3 million square feet of commercial office space. (Annex C)

- The TPD has considerable historical experience with the use of the bicycle as a mode of transportation for officers within the downtown district. It established its Bike Squad in this area more than 20 years ago.

- Thirty-five manually-powered Volcanic-brand mountain bikes currently make up the fleet of bikes within the Tempe Police Department. (Rowan)

- Volcanic, a company based in Washington, specifically designs mountain bikes for police patrol functions. (Volcanic Bikes)

- A new patrol-ready Volcanic mountain bike costs approximately $2,200, including such accessory items as a gear bag, helmet, and lights. (Kleppe)

- Volcanic offers a lifetime frame warranty, as long as the bicycle is maintained by a certified Volcanic mechanic. (Volcanic Bikes) The TPD has several officers on staff who are certified Volcanic mechanics. As a result, damaged frames have been replaced free of charge on numerous occasions. (Kleppe)

- A physically fit officer can navigate through traffic and pedal from one end of the downtown district (as it is currently sized) to the other in approximately 60 - 90 seconds; however, based on personal experience, considerable energy must be exerted during such a ride.

- Typical bicycle speeds during routine patrol are less than 5 mph. When responding to a call-for-service, speeds are generally between 5 - 12 mph. From personal experience, a "top speed" on the manually-powered mountain bike, given ideal conditions, is generally around 18 mph.

Discussion

Background

The successful implementation of bicycles into an urban policing environment is not a novel concept. In fact, policing on bicycle began to appear around the 1860s, as jurisdictions began to spread in size, making patrol on foot impractical. (Petty) While the urgency in the use of a police bicycle has fluctuated over time with the rate of suburban sprawl and the availability of patrol vehicles, many agencies are again seeing a return of people to the urban cores of their communities, making police bicycle squads a necessity in the dense environment. (Petty)

E-bikes have been around for quite some time, although their use as a rugged alternative to a manually-powered bicycle did not really take hold until this last decade, as more efficient rechargeable batteries were able to be married to motors that could provide greater power output. (Turner) Now, e-bikes are available for hunters looking for an effortless way to get into the backcountry and tourists looking for an easy way to see the sights. During the last five years, the e-bike market has begun to advertise to law enforcement agencies. E-bike vendors are beginning to show up at law enforcement-centered conferences, such as the 2017 IACP Annual Conference and the 2018 IPMBA Annual Conference. (IPMBA Annual Conference)

Current Vendor and Model Specifications

While the e-bike industry is still relatively new, some companies have emerged a front-runners in this technology. In an effort to compare and contrast the options available from several vendors, *Figure 1* represents a sampling of companies that produce a rugged e-bike option. For easy comparison, specifications for the TPD's current manually-powered bicycle (Volcanic) are listed in the far-right column. This list is not limited to companies marketing e-bikes solely to law enforcement, as it is conceivable that should any bike meet needed specifications, a "Police" sticker can be affixed to it, making it an official police bike. However, if one of the listed companies offers a law enforcement model, those specifications are listed in *Figure 1 (page 18)*.[2]

Safety Considerations

Of primary concern is whether the possible implementation of these new fleet vehicles will

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2 Data in Figure 1 was sourced from the following websites: radpowerbikes.com; samsonebikes.com/collections/public-safety; two-wheelelectric.com/electric-patrol-bikes; rogueridge.com; trekbikes.com; and, volcanicbikes.com.

Company Name	Rad Power	Samson	Volt	Rogue Ridge	Trek	Volcanic
Cost	$1,500	Not listed	Not listed	$2,800	$3,600	$2,200
Year business established	2007	Not listed	Not listed	Not listed	1975	2005
Warranty	1 year	30 days	2 year	Not listed	Conditional	Lifetime
Wheel base	26"	27.5"	26" or 29"	26"	29"	26" or 29"
Top speed capability (in mph)	20 mph	Not listed	50 mph	28 mph	28 mph	18 mph
Mileage range (on full charge)	25-45 miles	30-50 miles	30-50 miles	25-50 miles	Not listed	n/a
Weight limit (rider)	275 lbs.	Not listed	Not listed	300 lbs.	250 lbs.	n/a
Manual bike option	Y	Y	Not listed	Y	Y	Only manual
Weight of bike	66.5 lbs.	Not listed	Not listed	65 lbs.	50 lbs.	34 lbs.
Motor/battery weather limit	Not listed	Not listed	Not listed	Not listed	Not listed	n/a
Full suspension frame system	Only front	Only front	Only front	Only front	Only front	Y
Speedometer	Y	Y	Y	Y	Y	N

Figure 1: E-bike vendor comparison.

pose a greater risk to the employees charged with riding them. The first factor to review is how bicycle speed may factor into injury severity. In a 1997 study published in *Injury Prevention*, 3,854 bicycle incidents in the greater Seattle area were examined for factors to assist with future prevention. (Rivara) The study uncovered the following:

- Bicyclists are 40% more likely to sustain severe injury when they are traveling at speeds greater than 15 mph at the time of a crash;
- Bicyclists are 50% more likely to be admitted to the hospital when they are traveling at speeds greater than 15 mph at the time of the crash; and,
- Bicyclists are 2.6 times more likely to die in crashes in which they are traveling at speeds greater than 15 mph at the time of the crash.

Speed & Other Considerations
As previously noted, typical bicycle speeds during routine patrols are less than 5 mph. When responding to a call for service, officers may reach speeds between 5 and 12 mph. A top speed on the currently-used, manually-powered mountain bike is abou 18 mph under ideal conditions. Officers are currently assigned a bike helmet to assist with protection, as their speeds rarely come close to — or exceed — 15 mph. In a survey of current members of the TPD Bike Squad, 40% indicated that if the bicycle they were riding could reach speeds in excess of 20 mph, then they would feel the need for such added protection as elbow and knee pads and larger helmets. (Annex E) Note that in *Figure 1*, top speeds range from 20 -

50 mph. At higher potential speeds, it is important to also ensure that the suspension system is capable of absorbing the bumps in the road. If not, the rider is susceptible to being thrown from the bike and sustaining injury. Curiously, among the bikes in *Figure 1*, the only model that features a full-frame suspension system is the manual bike option, which also is the slowest.

Another consideration is the listed weight limit for bike riders. In this circumstance, it is important to note that TPD officers are expected to wear an average of 40 - 50 pounds of law enforcement-related gear while riding a bicycle. Further, the weight of the bikes themselves also is valuable. It is not uncommon that officers need to pick up and carry their bicycles up several flights of stairs if responding to calls for service or navigating unique terrain.

Lastly, no information is readily available as to whether the battery systems would cause a danger to the rider if exposed to high heat or humidity — both of which are expected weather extremes during the summer months in Tempe.

Training Considerations
Officers who currently wish to ride a manually-powered bicycle in a patrol function for the TPD must first be certified in a three-day course that is developed and taught by members of the bike team. This course covers basic through advanced bike-riding techniques, as well as proper ways to navigate obstacles such as curbs, stairs, and vehicles. Officers are also taught tactical dismount procedures and how to effectively use their bicycles in heavy crowd

situations.

Should an e-bike be introduced into the bike fleet, it would be necessary to create a supplemental training day for currently certified bike officers, who would certainly need an opportunity to be taught the nuances of operation and care, including how to properly accelerate and brake, as well as how to charge and store batteries when not in use. If proper training is not implemented, the police department administration likely would be held liable if an injury occurred to a rider or a pedestrian due to negligent operation of the e-bike, as demonstrated in such cases as *City of Canton, Ohio v. Harris* (1989). (Ross)

Green Bay (WI) PD community officers use e-bikes. | Photo credit: *Government Fleet.*

Legal Considerations

Of interest is recent state-level legislation regarding the differences between e-bikes and mopeds and how their definitions may affect the use of this new technology. For example, as of now, if one of our officers fell off of a *manually-powered* bike, it would not automatically be considered a reportable vehicle accident, per Arizona Revised Statute (ARS). However, would this would change under existing laws with the use of the proposed technology? ARS 28-2516 defines an e-bike as a bicycle that, with a motorized "helper motor" can be operated at speeds of less than 20 mph. (Annex F) According to the current law, a crash involving an e-bike at speeds of under 20 mph would not be considered a reportable vehicle accident. Unfortunately, the laws are still vague and ever-changing, and presently there is no definition of when higher speeds qualify an e-bike as a moped, which would make a crash a single-vehicle reportable event. (Curtis) Tempe City Code Article VII also addresses e-bikes and states that it is unlawful for an e-bike to: (1) be operated on a public sidewalk, at speeds of over 28 mph when on a city street; (2) at speeds of over 20 mph when on a shared / multi-use path; or, (3) at speeds of over 5 mph, when passing a pedestrian or horse on a shared / multi-use path. (Annex G) There does not appear to be a public safety exception written into the Tempe City Code that indicates that any police department e-bike implementation would have to abide by these same laws while on general patrol.

Fiscal Considerations

The current TPD bike fleet consists of 35 bikes. Based upon the information gathered on four different e-bike models, the cost to replace the fleet with an e-bike option may total between $52,000 and $126,000. This cost may be somewhat offset through the sale of the current mountain bikes to other agencies. However, it is expected the sale of those bicycles will have very little impact on the total cost of completely replacing the fleet with e-bikes.

Maintenance and equipment costs are expected to be similar to what is now spent on the current fleet. The warranty length for the e-bike frame systems also should be considered. Given the added weight of equipment and rider, it is the bike frame that often wears out in specific places, requiring a replacement. If the frame of an e-bike is out of warranty, that cost will have to be taken into consideration as well.

Operator Perception

An important aspect in considering this project is providing a voice to the operators who would be tasked with riding the proposed e-bikes on a daily basis. As a result, in early April 2018, current members of the TPD Bike Team were given a 10-question survey to complete to solicit their feedback. In this survey, team members were asked to consider the

e-bike technology and how it may be an effective alternative now or in the future. In summary, the following results were noted: (Annex E)

- Only one team member had ridden an e-bike in the past; however, that same person had a favorable experience when riding the e-bike.
- 33% of the team felt that an e-bike may make their current assignment easier, assuming the geographic boundaries of the downtown district are not changed.
- 67% felt that using a manually-powered bike could be easier.
- The team was nearly split, 53% to 47%, as to whether the use of an e-bike in the new ASU Stadium District would be of value.
- 91% of team members felt the use of an e-bike would be of value while patrolling events over long distances, such as the Ironman Triathlon.
- 64% felt the use of an e-bike would be of value while patrolling such locations as Arizona Mills Mall or Tempe Marketplace.
- About 79% of the bike team felt that the use of e-bikes would bring some form of ridicule to the bike squad from other agencies (ranging from good-natured jokes to all-out shaming).
- 73% of the bike team is supportive of further research into the e-bike option.
- 67% of the bike team members were willing to beta-test any possible new e-bikes.

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Potentional Solutions

OPTION I: Replace the current fleet of manually-powered mountain bikes with e-bikes.

Pros:
- All new bikes;
- Less potential for rider fatigue; and,
- Ability to cover larger distances / zone boundaries.

Cons:
- High cost;
- Training will need to be quickly developed and taught to all riders;
- Limited bike-frame warranties may have unexpected costs;
- Technology may not be what is necessary or safe

for the purposes of the TPD bike squad;
- Current operators have not yet bought-in with the technology; and,
- Legal considerations are still vague.

Costs:
- Between $52,000 – $126,000, depending on selected e-bike model.

OPTION II: Do nothing and keep current fleet as is.

Pros:
- Cost savings;
- Current operators do not have to adjust to a new system and would be more comfortable in the near future; and,
- TPD is familiar with the operation and repair of Volcanic bikes.

Cons:
- TPD loses the chance to be an innovative leader;
- TPD loses the opportunity to work with e-bike companies to develop a product that is specific to its needs;
- As zone responsibilities increase, continued use of manually-powered mountain bikes may become burdensome; and,
- In another two years, TPD may have to re-research the topic as new technology is advertised to law enforcement.

Costs:
- No cost to the department.

OPTION III: Continue to explore the e-bike option through research but make no immediate large-scale purchases aside from procuring one or two e-bikes for testing purposes.

Pros:
- Potential ability to work with vendors to design a system specific to TPD;
- Not fully committed to any particular path as such technologies as front-tire motors continue to emerge;
- Beta-testing one or two e-bikes will not significantly impact TPD budgets; and,
- TPD can make accurate predictions for success based upon practical experience.

Cons:
- TPD may miss early product designs as well as

Continued →

	Alternative #1	Alternative #2	Alternative #3
Options Available	Significant concern	Muted concern	Moderate concern
Rider Safety	Significant concern	Muted concern	Moderate concern
Training Obligations	Significant concern	Muted concern	Moderate concern
Legality	Significant concern	Muted concern	Muted concern
Financial Obligations	Significant concern	Muted concern	Moderate concern
Lack of Innovation	Muted concern	Significant concern	Muted concern
Operator Perception	Significant concern	Moderate concern	Moderate concern

Figure 2: Concern levels for potential solutions.

lower pricing, if demand for e-bikes significantly increases in coming years.

Costs:
* Between $3,000 – $7,200 for two prototypes, depending on the selected e-bike model.

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Conclusion

Successful police departments have shown that innovation and the intelligent implementation of new technology can provide considerable support to the peacekeeping mission. However, history has also shown that making rash purchasing decisions without proper research has often relegated "last year's new technology" to the storage closet.

Replacing the current fleet of manually-powered mountain bikes with e-bikes is certainly an opportunity worth exploring. Yet certain features of an e-bike program may not be suitable to the current or future needs of this agency. Three alternatives have been suggested: (1) replace the entire fleet with e-bikes; (2) don't change the fleet at all; or, (3) continue to research this option but develop a wait-and-see approach to the technology while testing one or two e-bike models.

Each option was considered based upon vendor options, safety concerns, training obligations, legal considerations, financial obligations, level of innovation, and operator mindset. In comparing and contrasting the information in this study, the concern levels were assigned to each alternative, as indicated in *Figure 2*.

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Recommendation

The TPD is committed to exploring innovative ways to continue to provide exceptional customer service to our community. In this effort, it is important for the TPD to remain keenly aware of the technological advances related to e-bikes and the benefits that e-bikes may provide now and in the future. For this reason, it is required that the TPD continue to research e-bike options, work with vendors to consider the purchase of one or two e-bike models for trial purposes, and continue to review existing protocols and laws in an effort to prepare for the eventuality when an e-bike meeting each need becomes available. As such, Option III is authorized. A proposed implementation schedule has been included as an annex. (Annex H) §

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Mindful Smartphone Use for Improved Work / Life Relationships

by Rick Peterson

I F YOU are anything like me, I feel lost without my cell phone. I set it down to write this article — but rest assured, I can see it sitting here next to me! In the Officer Wellness class that I instruct in Northwestern's School of Police Staff and Command (SPSC), I overview how cell phones have become a huge part of our daily stress. In a recent SPSC class, a student had three cell phones in front of him on his desk. I couldn't help but to inquire as to why. His answer was simple: two of the phones were for work; and, one was his personal cell phone. Without hesitation, he continued to say, "I hate these things. I can never get away from any of them at any time. I am mad at what they have made my life become."

MAD

Because of this conversation, I have formulated a new acronym for smartphones: MAD, short for Mind Altering Device. Many of you are probably reading this article on your MAD. The telecommunications industry portrays these devices as tools for talking to someone (i.e., carrying on a spoken conversation). However, smartphone technology has altered the way we communicate, and according to researchers, the way we live has altered as a result.

Virginia Tech researchers surveyed 105 managers, 108 full-time employees, and 138 significant others on required email management during non-working hours in an effort to understand the effects of these requirements on workers in their off-hours. The survey revealed that the expectation of monitoring work email caused increased anxiety in employees. According to an ABC News report, "Significant others also reported decreased relationship satisfaction in contrast to employees themselves, whose satisfaction was not affected by the constant monitoring of work email." (Kalra)

Clinical psychologist and author Dr. Mitch Abblett notes that in addition to the physical *text claw* (the stiffness in fingers and wrists from too much texting), overuse of smartphones can lead to Problematic Internet Use (PIU), which is considered to be a behavioral addiction. According to Abblett, "As we get more connected to our wireless technology, we appear to run the risk of damaging our brains' wiring, and disconnecting from the face-to-face interaction that our social and psychological systems need."

Columbia University communications instructor, RAND Corp adjunct, and *Leaders Eat Last* author Simon Sinek, muses in multiple TEDx talks that our society has no idea what the future may hold for today's children who are growing up in a smartphone society. He insists that because the adolescent brain is not mature enough to handle the social aspects of smartphone use and abuse, that the results may

include significant increases in rates of suicide, homicide, depression, and accidental overdoses. Could these results also spill over into adult demographics?

Research is revealing that internet and wireless technologies already have resulted in shifts in our brains' wiring that are damaging to human relationships. MIT media scholar Sherry Turkle has authored two books on the topic, *Alone Together* and *Reclaiming Conversation*. In the latter, Turkle discusses research findings of a 40% decline in empathy markers over the last two decades — but especially over the last 10 years. For example, have you ever used the "praying hands" emojii in a social media post for someone who is grieving rather than taking the time to personally reach out? Thankfully, according to Turkle, human beings are resilient. "I like the study that shows that after five days away at camp without connections, you see the empathy markers among children rising. The ability to recognise the emotions of somebody in a video or a story goes right back up. I believe we are wired to talk." (Adams)
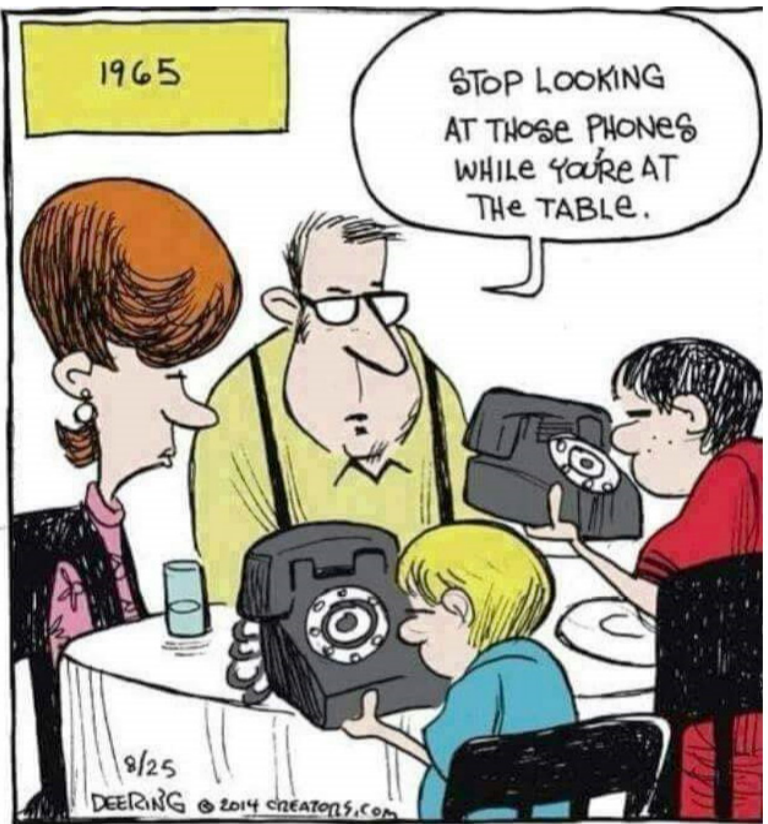
MADly Mindful

MAD have the potential to impact the quality of everyone's personal and professional lives by affecting the ability to effectively communicate and relate to others. If your MAD is impacting your job or your family life, you may find one or more of the following statements to be true:

- My phone interrupted conversations or meetings at work.
- My agency expects me to never turn off my cell phone or set it aside.
- My smartphone has affected my relationship with my spouse or children.
- My family and I check texts or use our smartphones at the dinner table.

I'm not immune from the lure of my MAD. Smartphones have become more integrated into our lives than any other object in recent memory. However, I suggest becoming more aware of our phones' impacts on our relationships and strive to reduce the negative effects they may have on face-to-face communication. For instance, let's say you are walking down the hallway at your police agency, and a coworker approaches you to ask a question. If you continue to hold your phone in your hand, you have just sent a signal to that coworker that he or she is less important than your phone. You don't even have to be using your phone at that moment of interaction. Instead, when that co-worker approaches and wants to chat, put the phone in your pocket or set it somewhere away from the conversation. What you have just wordlessly communicated is that your colleague is important and that you are listening.

If you are at home at the dinner table and lay your phone down next to your plate, you are conveying to your family members that your phone is more important than the family gathered to eat dinner together. Even turning your phone upside down and setting it on the dinner table is not conducive to meaningful conversation. Be mindful of the moment and remove it from sight while you sit with your family.

MADly Mindful

Mindfulness-Based Stress Reduction (MBSR) combines mediation, body awareness, breathing exercises, and other relaxation techniques to help people become more mindful in order to achieve such goals as stress reduction and improved quality of life. MBSR can be used to help individuals change their MADs back into phones. The following mindfulness, based on the principles of MBSR, may help you change your relationship with your phone and with people.

1. The next time you turn to your phone, hover your finger over the home screen or app folders. Before opening your email, social media, texts, or other app, ask yourself the following questions:
   - Is there an impulse drawing me to a specific app or to my email?
   - Is there a want or desire enticing me to see what is going to be there?
   - Do I feel a sense of frustration when I look at the screen?
   - Do I feel angry at something or somebody related to an app, text, or email?
   - What do I expect to see once I open an email, text, or other app?
2. Take a deep breath and relax. Don't let the phone dictate those thoughts or emotions. Seeing a post about where your spouse's friend is eating dinner really isn't that important.
3. Now, go ahead and click on the app or email.

After practicing these steps, you will feel more in control of your smartphone use.

Ironically, you can use your smartphone to help improve your relationships at home and at work, to become more mindful, and even to reduce your smartphone usage:

1. Every smartphone has a calendar.
   - Make a weekly repeating calendar entry to set aside time for calling your spouse or your kids and telling them that you love them.
   - Make a daily calendar appointment for "me time" — five to ten minutes out of your day that focuses on you and how you are feeling at that moment. What you do with that time is up to you. I practice self-reflection during my "me time."
2. Completely turn off notifications for your social media applications. You don't need to hear Facebook pops on your phone all day.
3. As discussed earlier, set your phone aside or put it in your pocket when engaged in conversation. Pay attention to what is being said. Active listening becomes easier with practice.
4. Become cognizant of the smartphones all around you. Notice people using their phones, what is happening around them, and what they are missing. We are consumed with our smartphones. Becoming aware of that is an important step toward minimizing your own smartphone's negative impact.

After you are done reading this, I would like for you to consider becoming more mindful of your phone and what it may be doing to your relationships. Henry David Thoreau wrote, "The cost of a thing is the amount of what I call life which is required to be exchanged for it." You will never regain those hours lost to your smartphone screen. §

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Current Realities of Automated Driving Systems

by Robert K. Seyfried, PE, PTOE

*In a follow-up to Victor Beecher's article, "The Human Hurdle: Human Error as a Roadblock to Early ADS Adaptation" (*The Key*, Dec 2018), NUCPS traffic engineering expert Robert Seyfried offers his view of current, practical issues from the technology side that must be addressed before ADS benefits can be realized.*

IN A RECENT *SMITHSONIAN* magazine article, technology and science writer Tom Vanderbilt related his experience riding in a Chrysler Pacifica minivan, a Waymo-navigated autonomous vehicle (ADS), with Dmitri Dolgov, Waymo's CTO and VP of engineering. Vanderbilt, the *New York Times* bestselling author of *Traffic: Why We Drive the Way We Do (and What It Says about Us)*, noted that the car "deliberately, cautiously, follow[s] the law to the letter. It drives the way you yourself probably did during your driver's license exam."[1] An admirable quality perhaps — but is it really what we want from our vehicles? Is it always best to have the vehicle follow the letter of the law?

This is just one of a number of important and knotty practical questions that need to be answered about how ADS vehicles should use the roadway system. Suppose you are on an urban freeway and your autonomous car is traveling exactly at the 55 mph speed limit, but nearly everyone else on the roadway is going 60 or 65 mph or higher. Safety data suggests that the safest speed to be traveling is the same speed as everyone else. Would it be safer if your ADS gauged the speed of other vehicles and tried to blend into the traffic flow even though it might mean violating the speed limit? [2]

A similar dilemma is following distance. The "Illinois Rules of the Road" handbook states that drivers should maintain a following distance of at least 3 seconds of travel time behind the vehicle ahead of us; however, the *Highway Capacity Manual*[3] indicates that the maximum flow rate on freeways occurs when average headways are about 1.5 seconds. If ADS vehicles obey the three-second guideline, the capacity of a freeway could be cut in half. Certainly not a desirable outcome during rush hour.

In addition to letter-of-law and driving etiquette matters that such ADS developers as Waymo must address, advanced ADS vehicles present liability and financial issues. For instance, suppose that Officer Friendly pulls over that autonomous vehicle holding up traffic on Lake Shore Drive. Who gets the citation? A, the occupant who is not driving the car; B, the owner of the car who may not be an occupant; or C, the car manufacturer or software developer. Most likely, the court systems will be addressing such questions in the near future.

Finally, as a society are we willing and able to pay for the cost of ensuring that the autonomous vehicles on our roads are maintained to operate autonomously? I recently replaced a low-tire-pressure sensor on my car. I gladly paid several hundred dollars for the work because I like the reassurance of knowing when my tires need air. But suppose in the future that we reach a point when some ADS vehicles on the road are 10, 15, or 20 years old or even older. Just as older vehicles today have depreciated and require more and more maintenance needs, so too will older autonomous vehicles. Will second, third, or fourth owners of an older "beater" ADS vehicle be willing — and able — to pay to replace failing sensors and control technology? If not, is there a practical way to keep faulty or no-longer autonomous vehicles from interacting with the increasingly sophisticated vehicles of the future?

Discussions of autonomous vehicles usually tend to focus on rapid advances in technology and expected advantages of safety and operational efficiency. And clearly there is much to be gained. However, the foregoing practical issues will have to be resolved before the benefits can be achieved. §

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[1] Vanderbilt, Tom. (2018, Dec). "Why Waymo's Fleet of Self-Driving Cars Is Finally Ready for Prime Time." Smithsonian. Retrieved from https://www.smithsonianmag.com/innovation/waymo-fleet-self-driving-cars-ready-prime-time-180970713/

[2] Vanderbilt
[3] Transportation Research Board. (2016). Highway Capacity Manual, Sixth Edition. Washington, DC.

BIG DATA &
Predictive Policing

"Data! Data! Data! I can't make bricks without clay!"
— Sir Arthur Conan Doyle's Sherlock Holmes
in "The Adventure of the Copper Beeches"

by Caroline Paulison Andrew

BIG DATA **has only recently become part of the common lexicon,** but it has existed in practice since ancient times. Beyond any bureaucracy that the Ancient Romans could have imagined, the US government utilizes massive amounts of required data to set or report the thousands of rates, statistics, and sum totals upon which its governmental operations and global leadership are based. For more than a century, corporate America has analyzed its customer and industry data to make decisions about capital spending, product development, and human resources, as well as to predict future growth and sales. Marketing professionals, in turn, have used this data for decades to target audiences for direct mail and catalogs, and in the 21st century, email blasts and online ads. Now, as a new decade is within sight, data is shaping law enforcement actions and decisions like never before. With it, comes great promise and great responsibility.

Machine Learning

The differences between today's big data versus that of 200 BCE, 1776, 1950, and 1992 not only include incomprehensible amounts of utilized data, as compared to early LAN databases and pre-computing paper files — but also how that data is analyzed and processed. Advances in *machine learning* have progressed artificial intelligence to where systems can process massive amounts of data, learn from that data, and then predict outcomes or behavior and even generate a description of a future state, all based on data.(Copeland) The more data the system is fed, the more the machine learns. In *The Rise of Big Data Policing*, national predictive policing and procedural justice expert Andrew Guthrie Ferguson provides the following illustration of big data:

> "[The] system integrates, analyzes, and shares otherwise-hidden clues from a multitude of ordinary law enforcement data sources. A detective investigating a robbery suspect types a first name and a physical description into the computer — two fragmented clues that would have remained paper scraps of unusable data in an earlier era. . . . By matching known attributes, the computer narrows the search to a few choices. A photograph of a possible suspect's car is identified from an automated license-plate reader scouring the city for data about the location of every vehicle. Detectives follow up with a witness

to identify the car used in the robbery. A match leads to an arrest and a closed case."

However, machine learning should not be mistaken for automation; it is about finding patterns in data that humans may miss and that may help with decision making. (Faggella) "Attempting to use it [machine learning] as a blanket solution . . . is not a useful exercise; instead, coming to the table with a problem or objective is often best driven by a more specific question." (Faggella)

Big Data & Predictive Policing

The analytics that inform predictive policing use machine learning, big data, and statistical models to identify and forecast such matters as locations and times of potential criminal activity, recidivism issues, and other targets for potential police intervention, all toward the general goals of preventing crime and protecting the public. The data itself is sourced from not only from past police agency data and surveillance cameras but from social media, communications, consumer data brokers, financial records, and all the other fingerprints that humans leave during the course of living their daily lives and is then sold to law enforcement by data brokers. (Ferguson) With advances in facial recognition software on linked video surveillance cameras, federal, state, and local law enforcement agencies soon will be able to access "massive biometric databases." (Ferguson) Ferguson rightly claims, "This the future. This is the present. This is the beginning of big data policing."

Predictive Policing in Action

An essential component of predictive policing is getting the information to the officers who need it — when or before they need it. In some agencies, officers are given the day's crime forecast at the start of shifts. The theory of predictive policing is to have police in the right location at the right time with the goal of preventing crime. (Ferguson) The FBI is even attempting to use predictive policing to try to forecast and pre-empt information security breaches. (Fritsch)

James Lingerfelt, a 24-year veteran of the Washington DC Metropolitan Police Department and its former CIO, states that when it comes to big data

analytics, agencies must first determine whether or not they need an in-house analytics department or go the route of interagency collaboration. Lingerfelt, who is now a senior consultant on IBM's Global Smarter Cities team, emphasizes that "Everything should be focused on understanding what is necessary to achieve the operation goals that contribute to mission accomplishment." (Wyllie) He considers the crime analyst an "unsung hero" and critical to moving toward the goal of policing at lower costs. As early as 2013, Lingerfelt stated that the crime analyst position would "become exponentially more important in solving crime, but it also has evolved into one that relies on instincts, historical knowledge, and computer savvy." (Wyllie)

Predictive analytics are becoming so essential that larger departments have created predictive analytic groups. In 2017, the Chicago Police Department (CPD) developed its Strategic Decision Support Centers (SDSCs). Initially, six of these technology hubs were located in stations throughout the city. Due to their effectiveness in reducing violent crime, the city plans to open more. (Douglas)

Jonathan Lewin, the CPD's chief of technical services, told attendees at the 2018 Consumer Electronics Show in Las Vegas that "we were able to tie together a range of technology into a single platform. . . . [T]he intelligence analyst and that daily intelligence cycle, is really important." (Douglas) In its Consumer Electronic Show video, the CPD's strategy of "smarter policing, fewer victims" includes "SDSC personnel using data analysis and technology to provide officers with real-time information and deploy them more effectively; crime forecasting software to identify areas most at risk for violence; and 360-degree feedback to analyze data transmitted from officers in the field." (Douglas)

Whether using information from metro data centers or smaller inter-agency cooperatives, predictive policing and crime forecasting can help leaner agencies be more proactive in crime reduction and more effective, more efficient when responding to all types of calls, from shots-fired and domestic violence to bank robberies and traffic stops.

Big Data, Big Responsibilities

Will big data-driven predictive policing become our

Orwellian future? No one — not even law enforcement professionals — is excluded from its reach. Will the DNA that we so happily supply to such services as 23&Me or Ancestry.com — to uncover clues to genealogical or hereditary mysteries — one day be used to target our descendents as "future suspects"? Indeed, behind the rise of big data and predictive policing are big ethical quandaries, emerging First Amendment privacy challenges, and data integrity and information security responsibilities.

Author Ferguson refers to big data as *black data* based on its traits: "opaque, because the data exists largely hidden within complex algorithms; as in racially coded, because the data directly impacts communities of color; as in the next new thing . . . due to the perception that data-driven anything is cool . . . ; and, finally, black as distorting, creating legal shadows and constitutional gaps where the law used to see clearly."

In February 2019, Family Tree, a consumer DNA-test kit manufacturer, granted the FBI on-going access to its genetic profiles, totaling more than one million entries. The company also agreed to test DNA evidence for the FBI. (Hernandez) This highlights a key DNA privacy concern: those who upload their DNA profiles do so willingly; but, their close or distant relatives have not done so, nor have future progeny.

Data integrity and security also are of significant concern. Following the adage "Garbage in, garbage out," predictive policing can only be as successful as its data is accurate. Not only can bad data confound policing efforts, it has the potential to harm innocent civilians, from wrongful arrest and job loss to deportation and incarceration. For an example, return to Chicago. The CPD's gang database, containing data on 128,000 adults, is the center of a federal lawsuit against the City of Chicago. The suit claims that the database violates due process protection, discriminates, and is "full of errors." (*Chicago Sun-Times*) As an example, the *Chicago Sun-Times* interviewed Lester Cooper, who was placed under house arrest and on electronic monitoring for traffic violations because his name was erroneously included in the gang database. The city's inspector general, Joseph Ferguson, has stated that the database lacks transparency and accountability, "which is a matter of great worry and concern."

Direct mail professionals will concur that accurate, reliable data from reputable data brokers are hard to find. Once acquired, it must be maintained. In his *Forbes* article, data expert Kalev Leetaru takes readers on his labyrinthine journey of unraveling why he, a single, childless, 30-something, received an AARP mailer — a maze that led him into the the depths of consumer data mining and even to the eminent Oracle Data Cloud, which had mistakenly labeled Leetaru a "successful single parent," a "golden grandparent," "obsessed with women's cosmetics," and a consumer of "baby products, especially diapers and baby food."

Finally, access to big data comes with critical security responsibilities. The data on which predictive policing relies includes personal details that are far more sensitive than shopping habits — data that must be protected from hackers, information miners, provenance issues, and security vulnerabilities.

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Contributors to this issue

David Bradford, Executive Director, NUCPS. Bradford is the former chief of police of the Glen Carbon (IL) Police Department. During his tenure at NUCPS, he has helped enhance the center's repuation as a global leader in LE professional development and education. He is chair of the Acceditation Council of ILEAP and is an active member of several professional associations. Bradford is a former IACP executive board member and a past president of the Illinois Association of Chiefs of Police (ILACP) and of the Southern Illinois Police Chiefs Association. His articles have been published in *Police Quarterly* and *Public Personnel Management*. He earned his Master's of Public Administration from Southern Illinois University.

Chris Cronin, ISO 27001 Auditor, Partner, HALOCK Security Labs. Cronin possesses more than 15 years of experience helping organizations with policy design, security controls, audits, risk assessments, and information security management systems within a cohesive risk management process. He chairs the DoCRA Council (Duty of Care Risk Analysis Standard) and is the principal author of the *Center for Internet Security® Risk Assessment Method (CIS® RAM)*. Cronin is a frequent speaker and presenter at information security conferences and events. He earned his MA from Case Western Reserve University.

Joseph Fitzgerald, PhD, Principal, The Peele Group & Adjunct Instructor, NUCPS. Fitzgerald is an expert in the field of law enforcement organizational leadership and change management. He is a sergeant with the Berwyn (IL) Police Department and is a graduate of SPSC Class #360. He received his MA in Public Policy & Administration from Northwestern University and his PhD in organizational leadership from the Chicago School of Professional Psychology.

John Furcon, Industry Consultant. Furcon is the former director of Research & Consulting at NUCPS. He designs and implements organizational management programs for law enforcement institutions. Furcon is the 2009 ILACP President's Award Recipient and has authored numerous articles published in industry magazines. For more than 40 years, he has consulted with law enforcement and private sector organizations on change management, organizational effectiveness, and executive development. He earned his MBA from the University of Chicago and his MS in psychology from DePaul University.

Caroline Paulison Andrew, *Key* Editor / NUCPS Alumni Relations Liaison. Andrew is editor and staff writer for *The Key,* NUCPS' social media manager, and NUCPS Alumni Relations liaison. She offers more than 25 years of communications expertise, including significant experience in the association, publishing, and legal industries. Andrew earned her BA in Philosophy from Northwestern University and her MBA in marketing from Loyola University Chicago.

Rick Peterson, Adjunct Instructor, NUCPS. Peterson is a retired law enforcement professional with more than 30 years of experience. He worked in the Washington County (MN) Sheriff's Office for 25 years, after which serving as a detective for the State of Minnesota's Department of Commerce. He teaches "Internal Conflict within the Police Organization" and "Officer Wellness" for SPSC. Peterson served as the president of his own SPSC Class #110.

Kenton Rainey, Chief, University of Chicago Police Department. Rainey has nearly 40 years of experience in law enforcement. Prior to joining the University of Chicago in July 2017, he served as chief for the San Francisco Bay Area Rapid Transit (BART) Police Department. He also was chief of the Fairfield (CA) Police Department and a commander for the San Antonio (TX) Airport Police Department. A Chicago native, Rainey earned his BS in criminal justice from California State University, Long Beach, and his MS in organizational management from the University of Phoenix.

Robert K. Seyfried, PE, PTOE, Adjunct Instructor, NUCPS. Seyfried is a former NUCPS transportation engineering program director and continues to work with the Center as an adjunct instructor. He is the author of multiple articles and publications on traffic and transportation engineering.

John Thompson, Tempe (AZ) Police Department. Thompson is a graduate of SPSC Class #437. His staff study was selected for publication and published with his permission.

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