COMMONWEALTH of VIRGINIA

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September 30, 2017

The Honorable Brian Moran
Secretary of Public Safety and Homeland Security
P.O. Box 1475
Richmond, Virginia 23218

The Honorable Emmett W. Hanger, Jr.
Co-Chairman, Senate Finance Committee
Pocahontas Building, Room E507
P.O. Box 396
Richmond, Virginia 23219

The Honorable Thomas K. Norment, Jr.
Co-Chairman, Senate Finance Committee
Pocahontas Building, Room E603
P.O. Box 396
Richmond, Virginia 23219

The Honorable S. Chris Jones
Chairman, House Appropriations Committee
Pocahontas Building, Room W1312
Richmond, Virginia 23219

Daniel Timberlake, Director
Virginia Department of Planning and Budget
1111 East Broad Street
Room 5040
Richmond, Virginia 23219

Dear Secretary Moran, Senators Norment and Hanger, Delegate Jones, and Director Timberlake:

Budget Amendments – HB1500 (Conference Report), Item 394 #3c states that "The Department of Corrections shall review the current and future use of technology within the department for the purposes of increasing security and employee productivity and achieving long-term cost savings. The department shall give consideration to technological innovations which could be applied to current and future correctional facilities and to the supervision of offenders in the community." Please find attached a report of the department's review.

Sincerely,

Harold W. Clarke

Attachment

cc: Cookie Scott
Rick Davis

Virginia
Department of Corrections

Assessment of the Current and Future Use of Technology

Executive Summary

September 2017

Submitted to:

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1 About this Executive Summary

This Executive Summary highlights the results of an assessment of the current and future use of technology conducted by the Virginia Department of Corrections (VADOC). This assessment was commissioned by the Virginia General Assembly to evaluate how the Virginia Department of Corrections currently uses technology and how technology can be applied to further increase security, productivity, and long-term cost savings for the Department.

VADOC engaged Impact Makers, a Virginia-based management and technology consulting firm with knowledge of VADOC and expertise in such efforts, to assist it in conducting the assessment. In addition, VADOC convened a committee of key personnel from across the organization to contribute their expertise, understanding of VADOC business needs, and knowledge of technology to the assessment. The assessment also included research to discover how technology has been applied in other states and localities, both in corrections and in other areas, as well as in other industries.

The analysis of each technological innovation evaluated how it would impact the rehabilitation and recidivism prevention programs put in place by VADOC. For an innovation to be useful to VADOC, it must complement existing programs, at a minimum. The basis of this analysis is the assumption that the best way to control corrections costs is to continue to reduce the number of offenders returning to custody.

In addition, this analysis focused on the three major technology benefits cited in General Assembly's mandate: increased security, increased productivity, and long-term cost savings. Moreover, to provide a basis for how technology has helped VADOC improve security, productivity, and long-term cost savings to date, a review of the efforts made by VADOC in terms of programs and the technology that support them was performed and the results are included at the beginning of this report.

1.1 Business of Corrections

There are four basic purposes in corrections: 1) retribution, 2) deterrence, 3) incapacitation, and 4) rehabilitation. Traditionally, corrections has been more focused on retribution, deterrence, and incapacitation and less focused on rehabilitation. The buildings, grounds, corrections officers, security, procedures, etc. in corrections facilities are all designed to keep offenders secured within a facility and society protected from these individuals.

VADOC, however, focuses its efforts on the rehabilitation aspect of corrections, which has become a primary focus of the programs within VADOC. As a result, the Commonwealth of Virginia's (hereinafter the Commonwealth) recidivism rate has declined. Therefore, VADOC is in the business of managing offenders and all VADOC functions are performed to manage the offender population from intake/classification through incarceration, release, and community corrections.

1.2 IT to Support the Business of Corrections

VADOC's Corrections Technology Services Unit (CTSU) and Electronic Security Departments support the applications and technology that allow VADOC to conduct its business; the greatest technology impact for VADOC is in supporting offender management. As a result, VADOC program changes to focus on rehabilitation have made a dramatic difference for the Commonwealth, and could not have been implemented or managed without the technology that VADOC has put in place to support them.

To provide this information, VADOC made a major investment in VirginiaCORIS, the VADOC Offender Management System (OMS), and this investment has been pivotal in providing the programs that have

helped Virginia attain the lowest recidivism rate in the nation. Like VADOC, VirginiaCORIS has also received national recognition for the contributions it has made to improving the Business of Corrections in the Commonwealth[1].

1.3 Executive Summary Organization

The organization of this Executive Summary parallels that of the full report. It begins with summaries of the recent history of technology use at VADOC and where the Department is today in this regard. This review is followed by a listing of recommended short-, medium-, and long-term technology improvements. Discussion of these recommended improvements is included in the full report. The Executive Summary closes with a Conclusion section, as does the full report.

2 History of Technology within the Virginia Department of Corrections

The Virginia Department of Corrections has made significant technological improvements in the last couple of decades. By the late 1990s, VADOC realized that its unintegrated technological environment marked by applications and hardware that were out-of-date was no longer supportable. Rather than simply modernizing existing technology as was done in numerous states, VADOC elected to rethink its approach and make the changes necessary to use technology as a tool to implement the forward-looking programs that have made Virginia a corrections leader nationwide.

2.1 The Virginia Department of Corrections Fifteen Years Ago

As the 21st century began, VADOC was still using a collection of individual systems that did not share data, that were built with computer languages that were no longer suitable for the rapid changes required, and that were running on computer hardware that was at the end of its useful life. For example, the primary offender management system was created in the 1970s and was still in use in 2005.

Vendors no longer supported the technology and as internal staff aged and retired, it became increasingly difficult to recruit staff to support the aging infrastructure, making VADOC dependent on expensive and scarce contract labor. Virginia was spending $2.5M a year on this technology and getting at best 12 hours of system use a day, six days a week to support the continuous availability needs of the corrections business.

VADOC's systems, moreover, were not optimized to support teams working in the field. Paper was the primary method of transferring information between systems and was dependent upon people re-entering information wherever it was needed. With a paper-based system, it was virtually impossible to maintain adequate security and privacy of the information that was copied, transported manually, and copied again.

With so much information on paper and so many different systems, VADOC was unable to provide any comprehensive view or reporting on the corrections systems or the offenders under its management. This gap hindered reintegration, investigations, offender health, and made the comprehensive rehabilitation programs in use today impossible to consider.

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1 NASCIO, The Virginia Corrections Information System (VirginiaCORIS) 2012 VirginiaCORIS Offender Management System

3 Where the Virginia Department of Corrections is Today

In 2004, VADOC initiated a project to redesign and rebuild its technology environment. This approach was groundbreaking in the world of corrections in its approach and breadth. The goal was not only to create an environment that would replace all the disparate systems in use to manage the offender population, but also to create an environment that would support the programs VADOC needed to reduce recidivism rates in Virginia.

The main result of this effort was VirginiaCORIS: a web-based, modular OMS that is built on a base platform that allows VADOC to customize the application as needed while still ensuring upgradability from the vendor. Upgradability is key to keeping the application up to date for the duration of its anticipated 30-year lifespan.

VADOC continues to add modules to VirginiaCORIS to further support the programs needed to manage the offender population and the programs used to rehabilitate and re-integrate ex-offenders back into society. The VirginiaCORIS implementation enabled VADOC to retire 25 siloed and antiquated systems, retire the aged and unsupported hardware that they ran on, and create a robust, flexible, state-of-the-art OMS that can grow as VADOC continues to mature and enhance the corrections programs used by the Commonwealth.

Another key requirement that VirginiaCORIS has met is the need for rapid access to information. Public Safety agencies of the Commonwealth need information to be available whenever it is needed. VirginiaCORIS has met this need as VADOC used it to replace an OMS that was only available at most 12 hours a day, six days a week with a system that is designed for 24/7 operations and has a 99.7% availability rate.

Through this consolidation and modernization, VADOC has reduced the number of systems in use from a high of over 50 to 25 in use today. VADOC not only addressed the need to meet the ever-increasing business requirements, but also the need to be fiscally responsible when scarce Commonwealth financial resources must be carefully apportioned.

It is also important to note that much of the funding used to implement VirginiaCORIS was raised through providing prison beds to other states. Opportunities like this can provide the VADOC unique ways to partially self-fund capital programs needed to improve business programs.

3.1 Costs of Currently Used Technology

Based on VADOC's budget, Corrections Technology Services Unit (CTSU) expends approximately $30.1M annually in support of VADOC's; approximately 83% ($25M) of fund services are provided by the Virginia Information Technologies Agency (VITA). In addition, VADOC incurs Non-CTSU technology costs through the Electronic Security Department which are included in the operational, security, and individual facility budgets and are difficult to isolate.

While there is no other Commonwealth agency exactly comparable to VADOC, inferences can be drawn from the IT support levels of some other Commonwealth agencies. In conducting this assessment, we reviewed IT staff and IT budget figures from the Virginia Department of Motor Vehicles, the Virginia State Police, the Virginia Department of Taxation and the Virginia Department of Transportation.

This review showed that VADOC has one of the highest infrastructure costs and lowest staff level to support the applications running on that infrastructure. Even considering that some of these agencies

employ a higher percentage of knowledge workers than VADOC and, therefore, require more technology support, VADOC's IT staffing is unusually low.

3.2 Current Level of Technology Support

Based on the its latest budget, VADOC's CTSU has 45 Full-Time Equivalent (FTE)[2] employees supporting its systems and the technology needs of its 11,769 employees. This staffing number has not changed since the implementation of VirginiaCORIS, despite the added support of VirginiaCORIS on a continuous basis, and results in a user to IT support staff ratio of 289:1.

The corresponding ratios for the other Commonwealth agencies considered in this study range from 10:1 at the Virginia State Police to 72:1 at VDOT. In addition, industry standards suggest that it would be more appropriate for VADOC to operate with one IT staffer for every 75 end users, considering the makeup of VADOC's workforce. With 13,000 end users (some users are not VADOC employees), the IT staff of VADOC should be 173, a nearly threefold increase above current levels.

With such a gap between current and more typical staffing levels, VADOC faces a significant strategic risk: the loss of one or more key staff members could cripple the organization's ability to support the systems that enable VADOC's mission essential functions. In addition, increasing the use of technology to benefit safety, productivity, and cost savings will only reap the most benefits if the Virginia Department of Corrections IT Department has the staff to support it.

In addition, not all technical components of VADOC's technology infrastructure are maintained by CTSU. Electronic Security, a team of four VADOC staff members, supports technology like video surveillance, video conferencing, panic alarms, burglary alarms, access control for both prisons and community corrections. Electronic Security divides the Commonwealth into three regions for support. Ideally, this function requires two technical support staffers per region as a minimum. A single person supporting an entire region is a single point of failure which puts VADOC at a strategic risk.

Nine of the recommendations in this report have an impact on the Electronic Security team. In any technology-based organization, as more technology is added, more staff will be needed to implement, monitor, and maintain it.

3.2.1 Level of IT and Technology Support Required to Enable Recommendations

In addition to requiring incremental CTSU staff to support current IT applications and Electronic Security technology, VADOC will need more staff to support whatever additional technology it implements. The actual number of staff needed should be determined by the technology implemented.

Some ideas, like improved video conferencing, would not necessarily require additional staff. Other items, however, like Active RFID tracking, might require an increase in IT staff to support the new systems involved and require additional Electronic Security staff for site support of equipment or training.

Other technologies might be supported by the VITA partnership and would not require additional staff, but would increase the current VITA costs for VADOC. CTSU and Electronic Security staffing levels will

[2] Agency IT Strategic Plan/799 DOC FY14-16 ITSP, VA DOC IT Strategic Plan for FY14-16

need to be addressed individually for each technology idea that is implemented along with additional budget to support associated increases in VITA costs.

3.3 Where the Virginia Department of Corrections Would be Today Without VirginiaCORIS

Prior to implementation of VirginiaCORIS, numerous prison processes were paper-based and would have remained so without VirginiaCORIS. There was little to no integration between the systems because of the outdated technology in use at the time. In 2005, staffers had to re-enter data in multiple systems because of the lack of integration. Staffers would continue re-entering that data today.

Most significantly, VADOC would not have been able to integrate COMPAS into these legacy systems. COMPAS is the system used by VADOC to assess offenders for prison programs designed to guide offenders into becoming productive citizens upon release. This application is one of the successful elements to the agency's commitment to rehabilitation.

The mobile technologies in use today would not exist. Community Corrections is especially dependent up on VirginiaCORIS Mobile to help them out in the field. Staffers in these roles would be deskbound accessing multiple systems and paper files to manage their caseloads.

3.3.1 Technology Creates Cost Savings that Justify Additional Technology Investment

Based on offenders who return to prison within three years of their release, the recidivism rate for Virginia Commonwealth prisons was 27.7% of released offenders in 2006. VADOC released about 12,000 offenders that year. By 2016, the recidivism rate was 23.4%, based roughly on 12,000 releases. The 2016 recidivism rate equates to 528 offenders who did not return to prison. The current average annual cost for Virginia to incarcerate an offender is $28,000; as a result, the reduction in recidivism described above translates to an annual savings of $14.8 million.

If the average of the recidivism rates between 2006 and 2016 is used we can approximate the incarceration savings to Virginia over that 10-year period. During those 10 years, with a high of 27.7% to a low of 22.8, the average recidivism rate is 25.4%, which is an average recidivism reduction of 2.3% from the 27.7% high. For simplicity, the following calculations assume all offenders are returned to prison for a one-year sentence as this is the minimum sentence to count as recidivism. Longer sentences would compound costs for each additional year on an offender's sentence.

$$12{,}000 * 2.3\% = 276\ offenders\ not\ returned\ to\ prison\ per\ year$$

$$276 * \$28{,}000 * 10\ Years = \$77.3M$$

Virginia's recidivism reduction is a combination of declining crime rates and quality offender education and mental health programs. These programs have had a significant impact on how much Virginia spends on incarceration and have improved the lives of the offenders who have been released and not returned to prison. While these cost savings cannot be completely attributed to the new systems and programs, these systems and programs have contributed to this reduction. These programs would not have been possible without the technology VADOC has put in place to implement and support them.

There is an IT industry consensus that it is reasonable to expect a reduction in costs of $3.50 for every $1 spent on technology that is supported by a strong business case in state government.[3]. This consensus is borne out by VADOC's experience with VirginiaCORIS and other technologies, and supports further technology investment for VADOC.

4 Future of Technology in the Virginia Department of Corrections

With the advent of smuggled cell phones and drones dropping contraband into prison yards, technology has made the job of corrections officers more difficult. Conversely, other new technologies have provided significant gains that can be applied to counter these and other challenges. In some cases, age-old problems now have technology-based solutions because the technology did not exist to counter risks like the smuggling of non-metallic weapons, drugs, and cell phones.

The recommendations for future technologies are listed below based on the timeframes within which the technology is feasible for implementation in VADOC: Short-Term (1-5 years), Medium-Term (5-10 years), and Long-Term (10-20 years). Recommended technologies are listed by the corrections business needs that they address. By confirming that a technology supports a valid business need before implementing it, VADOC avoids the risk of investing in technologies that will not further the programs in place to further improve the Commonwealth's recidivism rate.

It is important to note again that VADOC does not have the funding or staff needed to implement any of the technologies presented in this report. Any implementation of additional technology to support VADOC business needs will need to be supported by funding for the technology, programs, and the IT and Electronic Security staff needed to implement and support the required technology.

4.1 Technology and Programs for the Short Term (One to Five Years)

Technology listed in this section exists today and is available for immediate application. VADOC does not need to wait for the technology to mature further before applying it to meet VADOC business needs.

- **Comprehensive National Criminal Information Access**
  - FBI N-DEx System
- **Insight into Community Corrections Offenders between Visits**
  - Social Media Monitoring
- **Enhanced Perimeter Monitoring**
  - Drone Disablement
  - Radar/CCTV Surveillance
  - Drone Surveillance
- **Improved Offender Transportation Safety**
  - Real-time Vehicle Tracking and Fleet Management
  - Real-time Vehicle Cabin Video
  - Offender Tracking
  - Improved Offender Transportation Logistics
- **Increased System Availability, Scalability, Redundancy, Accessibility**
  - Cloud-based Computing

[3] Patrick Thibodeau, Senior Editor ComputerWorld, December 24, 2014, $1 spent on state government tech saves $3.50, study finds

- **Inventory Control**
  - Bar Coding
  - Passive RFID
  - Managing Assets in the Cloud
- **Offender Access to Technology to Improve Access to Rehabilitation Programs**
  - Tablets
  - Plug and Play Content Providers
  - Offender Wi-Fi Network
  - Revenue Generation from Content Sales/Rentals
- **Modern Video Surveillance**
  - High-Definition CCTV Roll-out
  - Comprehensive Video Storage Expansion
- **Cell Phone Use/Misuse Prevention**
  - Managed Access Services
  - Better Contraband Detection
- **Comprehensive Offender Tracking and Monitoring**
  - Facility-wide Active RFID
- **Increased Officer Safety and Productivity**
  - Body Cameras
  - Mobile Devices
  - Corrections Facility Wi-Fi
- **Single Source for All Offender Information**
  - Additional Modules in VirginiaCORIS
- **Enhanced Tele-Visitation**
  - Offender Devices and Service Scheduling
- **Enhanced Contraband Detection**
  - Person Screening
  - Shakedown Screening
  - Vehicle and Cargo Screening
- **Reduced Travel Expenses**
  - Telepresence/Video Conferencing
- **Enhanced Officer Training**
  - Virtual Classrooms
  - Probation Officer Technology Exploitation Training
- **Improved Offender Probation Visit Processing**
  - Automated Check-in Kiosks in Waiting Rooms
- **Reduced System Outages at Remote Sites**
  - Redundant ISPs
  - Increased Bandwidth at All Facilities
  - Removal of Network Bottlenecks
- **Comprehensive Information to Support Evidence-Based Practices**
  - Business Intelligence based on Data Governance and Data Warehouse
- **Increase Capital Budgets through Revenue Generation Opportunities**
  - License VADOC-developed Technology
  - Revise Revenue Generation Policy
- **Support for Mandated but Non-Compliant Technology**
  - Revision of VITA Policies

- **Offender Classification-Based Probation and Parole Model**
  - Expanded GPS Offender Monitoring
  - Mobile Officer Devices

4.2 Technology and Programs for the Medium Term (Five to Ten Years)

Technology listed in this section exists today but requires a significant amount of planning and time to implement, is dependent on a prerequisite that must be complete prior to applying the technology, or is dependent on significant efforts from another agency or external entity with priorities that are not aligned with VADOC.

- **Better Data Sharing Across Commonwealth and Federal Agencies**
  - Interface Standardization
  - Department System Upgrades
  - System Replacements
- **More Cost-Effective and Better Healthcare**
  - Telemedicine
- **Automation of Common and Time-Consuming Human Resource Processes**
  - VADOC Enterprise HR System

4.3 Technology and Programs for the Long Term (Ten to Twenty Years)

Ten to 20 years is a long time into the future, but it is important to note that VirginiaCORIS is now ten years old. The recommendations in this section, therefore, are realistic, long-term ideas to fully implement and enhance the programs already in place within the Virginia Department of Corrections. To realize these ideas will take a concerted effort from VADOC, along with multiple state and local agencies. Because ideas such as these – like VirginiaCORIS – often take many years to realize, VADOC should be alert for opportunities to move in the direction suggested by these concepts.

- **Single Source of Record for Commonwealth of Virginia Criminal Justice Information**
  - Unified Virginia Criminal Justice System (VCJS)
- **Automation of Low Offender Contact Officer Duties**
  - Robotic Corrections Officers
- **Automated Cargo and Inventory Management to Reduce Contraband**
  - Robotic Inventory Management
- **Automation of Offender Prescription Dispensing**
  - Robotic "Nurses"
- **Automated Offender Identification**
  - "Google Glass" Devices

5 Conclusion

This report contains many recommendations for using technology to improve safety, productivity, and cost savings. Since many of these initiatives depend upon technology that is already readily available, most recommendations are proposed for adoption during the next one-to-five years.

This study does not recommend that every technology idea listed here should be implemented immediately. Each idea is considered individually without analyzing dependencies on other technologies. To properly manage implementing one or more technologies listed here, VADOC would need to plan how to stage the implementations over multiple sites over a longer time and apply the appropriate Organizational Change Management (OCM) practices to ensure VADOC employees are notified, involved, and trained as needed for each new technology.

It is important to again note that VADOC does not have the funding or staff needed to implement any of the technologies presented in this report. Any implementation of additional technology to support VADOC business needs will need to be supported by funding for the technology, programs, and the IT and Electronic Security staff needed to implement and support the required technology.

Virginia
Department of Corrections

Assessment of the Current and Future Use of Technology

September 2017

Submitted to:

Harold W. Clarke, Director
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1 Introduction

This assessment was commissioned by the Virginia General Assembly to evaluate how the Virginia Department of Corrections currently uses technology and how technology can be applied to further increase security, productivity, and long-term cost savings for the Department.

1.1 Legislation

The Virginia General Assembly commissioned this assessment by means of HB1500 (Conference Report) Item 394 #3c Public Safety and Homeland Security which says the following, in part:

> *P. The Department of Corrections shall review the current and future use of technology within the department for the purposes of increasing security and employee productivity and achieving long-term cost savings. The department shall consider technological innovations which could be applied to current and future correctional facilities and to the supervision of offenders in the community. Copies of the review, including any recommendations as appropriate, shall be provided to the Secretary of Public Safety and Homeland Security, the Director of the Department of Planning and Budget, and the Chairman of the House Appropriations and Senate Finance Committee by October 1, 2017.*

1.2 Analysis Methodology

To facilitate this assessment, the Virginia Department of Corrections (VADOC) engaged Impact Makers, a Virginia-based management and technology consulting firm with knowledge of VADOC and expertise in conducting such assessments. In addition, VADOC convened a committee of key personnel from across the organization. The committee members brought to bear their expertise in their roles within the department, their understanding of the business needs within their areas, and the ideas they have been fostering to use technology to help further their programs to meet those business needs.

Impact Makers also performed additional research to discover how technology has been applied in other states and localities, both in corrections and in other areas, as well as in other industries. The goal of this research was to find innovative uses of technology that VADOC had not yet considered and to review the success of those innovations. These findings were used to see how these innovations would fit within VADOC programs and important considerations for VADOC to ensure a successful adoption of these innovations.

The analysis of each technological innovation evaluated how it would impact the rehabilitation and recidivism prevention programs put in place by VADOC. For an innovation to be useful to VADOC, it must complement existing programs, at a minimum. The basis of this analysis is the assumption that the best way to control corrections costs is to continue to reduce the number of offenders returning to custody.

In addition, this analysis focused on the three major technology benefits cited in HB1500: increased security, increased productivity, and long-term cost savings. Moreover, to provide a basis for how technology has helped VADOC improve security, productivity, and long-term cost savings to date, a review of the efforts made by VADOC regarding programs and the technology that support them was performed and the results are included at the beginning of this report.

1.3 Report Structure

The remainder of this introduction reviews the business of corrections in summary and discusses the information technology (IT) support required to support this business. The body of this report considers the:

- History of Technology within the Virginia Department of Corrections
- Current use of Technology within the Virginia Department of Corrections
- Future of Technology in the Virginia Department of Corrections

This approach is used to highlight the evolution from historical technology use through current state and to the future. Any future applications of technology will need to work with current VADOC technologies, and understanding these technologies is key to understanding how any future technology will work within this existing environment.

In considering future technology, a key guiding principle in this assessment is that technology for its own sake will not provide cost-effective improvements for the Commonwealth of Virginia (hereinafter the Commonwealth). To be cost effective, technology must be deployed in support of a business need and must realize demonstrable gains. To support this concept, each technology recommendation is presented in support of a stated business need.

1.4 Business of Corrections

There are four basic purposes in corrections: 1) retribution, 2) deterrence, 3) incapacitation, and 4) rehabilitation. Traditionally, corrections has been more focused on retribution, deterrence, and incapacitation and less focused on rehabilitation. The buildings, grounds, corrections officers, security, procedures, etc. in corrections facilities are all designed to keep offenders secured within a facility and to ensure society is protected from these individuals. The Business of Corrections for VADOC, however, is summed up in its mission statement:

> *We enhance the quality of life in the Commonwealth by improving public safety. We accomplish this through reintegration of sentenced men and women in our custody and care by providing supervision and control, effective programs and re-entry services in safe environments which foster positive change and growth consistent with research-based evidence, fiscal responsibility, and constitutional standards.*

This definition is focused on the rehabilitation aspect of corrections, which has become a primary focus of the programs within VADOC, and the Commonwealth's recidivism rate has improved because of this. Therefore, VADOC is in the business of managing offenders. All VADOC functions, including the support departments, operations staff, management, and IT, are performed to manage the offender population from intake classification through incarceration, release, and community corrections.

The Virginia Department of Corrections understands that the best thing it can do for the safety and prosperity of our society is to ensure that the people placed in custody are given the tools, education, training, and opportunity to return to society upon release and contribute in positive and constructive ways. The fundamental changes made to the Commonwealth's approach to corrections have been

effective and allowed the Commonwealth to achieve the lowest rate of recidivism in the nation[1]. These changes were enabled by a combination of quality programs and the technology necessary to provide the relevant information, communication, and support.

1.5 IT to Support the Business of Corrections

VADOC's Corrections Technology Services Unit (CTSU) and Electronic Security Departments support the applications and technology that allow VADOC to maintain its network of prisons, personnel, equipment, and community programs. While technology also supports business functions like Human Resources and Finance, the greatest technology impact for VADOC is in supporting offender management.

VADOC's program changes to focus on rehabilitation have made a dramatic difference for the Commonwealth, and could not have been implemented or managed without the technology that VADOC has put in place to support them. The required use of offender information to support both the prisons and community corrections programs would be impossible without technology.

To provide this information, VADOC made a major investment in VirginiaCORIS, the VADOC Offender Management System (OMS), and this investment has been pivotal in providing the programs that have helped Virginia attain the lowest recidivism rate in the nation. Like VADOC, VirginiaCORIS has also received national recognition for the contributions it has made to improving the Business of Corrections in the Commonwealth[2].

[1] VA DOC, State Recidivism Comparison, December 2016, State Recidivism Comparison Report

[2] NASCIO, The Virginia Corrections Information System (VirginiaCORIS) 2012 VirginiaCORIS Offender Management System

2 History of Technology within the Virginia Department of Corrections

The Virginia Department of Corrections has made significant technological improvements in the last couple of decades. By the late 1990s, VADOC realized that its unintegrated technological environment marked by applications and hardware that were out-of-date was no longer supportable. Rather than simply modernizing existing technology as was done in numerous states, VADOC elected to rethink its approach and make the changes necessary to use technology as a tool to implement the forward-looking programs that have made Virginia a corrections leader nationwide.

2.1 The Virginia Department of Corrections Fifteen Years Ago

As the 21st century began, VADOC was still using a collection of individual systems that did not share data and were built with computer languages that were no longer suitable for the rapid changes required. In addition, they were running on computer hardware that was at the end of its useful life. For example, the primary offender management system was created in the 1970s and was still in use in 2005.

Vendors no longer supported the technology and as internal staff aged and retired, it became increasingly difficult to recruit staff to support the aging infrastructure, making VADOC dependent on expensive and scarce contract labor. Virginia was spending $2.5M a year on this technology and getting at best 12 hours of system use a day, six days a week to support the continuous availability needs of the corrections business.

VADOC's systems, moreover, were not optimized to support teams working in the field. Paper was the primary method of transferring information between systems and was dependent upon people re-entering information wherever it was needed. With a paper-based system, it was virtually impossible to maintain adequate security and privacy of the information that was copied, transported manually, and copied again.

With so much information on paper and so many different systems, VADOC was unable to provide any comprehensive view or reporting on the corrections systems or the offenders under its management. This gap hindered reintegration, investigations, offender health, and made the comprehensive rehabilitation programs in use today impossible to consider.

3 Where the Virginia Department of Corrections is Today

In 2004, VADOC initiated a project to redesign and rebuild its technology environment. This approach was groundbreaking in the world of corrections in its approach and breadth. The goal was not only to create an environment that would replace all the disparate systems in use to manage the offender population, but also to create an environment that would support the programs VADOC needed to reduce recidivism rates in Virginia.

The main result of this effort was VirginiaCORIS: a web-based, modular OMS that is built on a base platform that allows VADOC to customize the application as needed while still ensuring upgradability from the vendor. Upgradability is key to keeping the application up to date for the duration of its anticipated 30-year lifespan.

In 2013, The State Compensation Board, faced with replacing its legacy LIDS application, instead worked with VADOC to host jail data within VirginiaCORIS, taking advantage of the existing robust modern architecture, and the considerable shared offender population base. Synergies were realized, not only saving the Commonwealth considerable cost, but also increasing public safety through improved data sharing between agencies.

VADOC continues to add modules to VirginiaCORIS to further support the programs needed to manage the offender population and the programs used to rehabilitate and re-integrate ex-offenders back into society. The VirginiaCORIS implementation enabled VADOC to retire 25 siloed and antiquated systems, retire the aged and unsupported hardware that they ran on, and create a robust, flexible, state-of-the-art OMS that can grow as VADOC continues to mature and enhance the corrections programs used by the Commonwealth.

Another key necessity that VirginiaCORIS has met is the need for rapid access to information. Public Safety agencies of the Commonwealth need information to be available whenever it is wanted. VirginiaCORIS has met this need as VADOC used it to replace an OMS that was only available at most 12 hours a day, six days a week, with a system that is designed for 24/7 operations and has a 99.7% availability rate.

Through this consolidation and modernization, VADOC has reduced the number of systems in use from a high of over 50 to only 25 in use today. VADOC not only addressed the need to meet the ever-increasing business requirements, but also the need to be fiscally responsible when scarce Commonwealth financial resources must be carefully apportioned.

It is also important to note that much of the funding used to implement VirginiaCORIS was raised through providing prison beds to other states. Opportunities like this can provide the VADOC unique ways to partially self-fund capital programs needed to improve business programs.

3.1 Selected Technologies is In Use Today

- **VirginiaCORIS**: Comprehensive Offender Management System that supports 17 standard corrections business processes: Reception and Commitment, Sentence and Time Accounting, Classification, Caseload Management, Security, Discipline, Housing Bed Management, Medical, Grievances, Programs, Scheduling, Investigation Gang Management, Property, Trust Accounting, Visitation, Release and Discharge, Community Supervision
- **CORIS Mobile:** Mobile device targeted version of VirginiaCORIS

- **Dingo**: First of its kind Canine Officer Management System[3]
- **COMPAS**: Offender assessment tool for determining needs of each offender
- **3M Electronic Monitoring**: Offender GPS tracking
- **Shadowtrack**: Low-risk offender monitoring and communication tool
- **JPay**: Offender payment and secure messaging platform
- **Honeywell MaxPro VMS**: High definition video surveillance
- **Microwave Sensors**: Point-to-Point intrusion detection

3.2 How this Technology Supports the Business Programs for Success

- **VirginiaCORIS**: This comprehensive system of offender management programs within VADOC maintains all aspects of an offender, including participating programs and scheduling.
- **CORIS Mobile:** Supports the VirginiaCORIS access needs of VADOC's mobile workforce.
- **Dingo**: Manages all aspects of the canine officers in service of the Department of Corrections.
- **COMPAS**: Provides standardized and comprehensive assessments of offenders with the results provided to VirginiaCORIS for incorporating into the offender profile for program assignments.
- **3M Electronic Monitoring**: Provides GPS tracking services for high-risk offenders to provide 24-hour tracking and violation notification.
- **Shadowtrack:** Interfaces with VirginiaCORIS to provide up-to-date tracking information to community corrections staff.
- **JPay**: Manages financial transactions for offenders and provides a secure messaging platform like email, but with many safeguards to monitor and control usage.
- **Honeywell MaxPro VMS**: Provides modern facility video surveillance and stored video management system for facility security and investigations.
- **Microwave Sensors**: Provides intrusion detection for perimeters and restricted areas at prison facilities.

3.3 Costs of Currently Used Technology

Based on VADOC's latest posted Strategic Plan[4], CTSU spends $25M in support service fees to VITA to support existing infrastructure needs, $2.5M for VirginiaCORIS licensing, $3M for IT staff, and $1M for contract IT staff. While these costs are the bulk of VADOC's spending on technology, they do not include spending that occurs outside of CTSU. Non-CTSU costs are attributed to the Electronic Security Department and are included in the operational, security, and individual facility budgets. They are not available as separate Strategic Plans and those costs have not been derived for this report.

[3] Service dogs in police, correction, and armed forces work are referred to as canine officers.
[4] Agency IT Strategic Plan/799 DOC FY14-16 ITSP, VA DOC IT Strategic Plan for FY14-16

3.3.1 Current Level of Technology Support

Based on the latest posted Strategic Plan, VADOC's CTSU has 45 Full-Time Equivalent (FTE)[5] employees supporting all of its systems. This staffing number has not changed since the implementation of VirginiaCORIS, despite the added support of VirginiaCORIS on a continuous basis.

According to the Gartner 2012 IT Enterprise Summary Report[6], State and Local Government agencies average a ratio of 3.6% as the percentage of IT FTEs to total employees. With an employee count of 11,769, that average would mean CTSU should have approximately 424 FTEs. This number stands in stark contrast to the actual current state. Applying that calculation to existing staff, VADOC's ratio of IT employees to all employees is 0.51%, or 14% of the national average for State and Local Government.

Because this overall average includes agencies that employ a higher percentage of knowledge workers and, therefore, require more technology support, it would be more appropriate for VADOC to operate with one IT staffer for every 75 end users. This ratio is in line with industry standards and slightly above the average from Gartner's published average Service Desk Staffing Ratio of 70:1[7]. With 13,000 end users (some users are not VADOC employees), the IT staff of VADOC should be 173; VADOC's current state represents a shortfall of 128 staffers, or one quarter of the 173 needed to properly support current VADOC CTSU Technology needs on a 24/7/365 schedule.

It is important to note that Gartner's report is specific to staffing a service desk. VADOC's service desk staff providing 24/7/365 user support is the same staff that maintains and updates all CTSU's systems and the same staff engaged when a system outage occurs. At the same time, many service desk functions are provided by employees of the VITA/Northrop Grumman IT Partnership. It is likely that these two factors offset one another.

VADOC's investment in modernization has positioned it for further innovation and has provided VADOC IT staff with career enrichment by allowing them to move to more rewarding jobs supporting modern web-based applications, but VADOC IT staffing levels have not kept up with the increases in functionality and availability. With current IT staffing levels, VADOC cannot provide continuous support for systems that require continuous availability.

With such a gap between current and more typical staffing levels, VADOC faces a significant strategic risk: the loss of one or more key staff members could cripple the organization's ability to support the systems that enable VADOC's mission essential functions. In addition, increasing the use of technology to benefit safety, productivity, and cost savings will only reap the most benefits if the Virginia Department of Corrections IT Department has the staff to support it.

CTSU already struggles with maintaining current staffing levels. Agencies like VADOC that are funded through the Commonwealth's General Fund cannot pay as well as non-General Fund agencies and lose staff to those agencies for talent that wants to work within state government. Talent is also lost to private firms that can easily pay more. VADOC's exposure to this strategic risk is compounded by not offering competitive salaries to prime candidates.

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[5] Agency IT Strategic Plan/799 DOC FY14-16 ITSP, VA DOC IT Strategic Plan for FY14-16

[6] Gartner, Gartner IT Key Metrics Data 2012 IT Enterprise Summary Report, Gartner IT Key Metrics Data 2012

[7] Gartner, March 27, 2015, Best Practices for Determining Your IT Service Desk Staffing Ratio

In addition, not all technical components of VADOC's technology infrastructure are maintained by CTSU. Electronic Security, a team of four VADOC staff members, supports technology like video surveillance, video conferencing, panic alarms, burglary alarms, access control for both prisons and community corrections. This unit also manages key controls, shaker fences, taut wire fences, microwave detection systems, and motion sensors. Given that this team is also facilitating the roll-out of new facility video surveillance systems, it also appears to be understaffed for the workload it faces.

Electronic Security divides the Commonwealth into three regions for support. Ideally, this function requires two technical support staffers per region as a minimum. A single person supporting an entire region is a single point-of-failure which puts VADOC at a strategic risk. The loss of a single person could have catastrophic results to the organization. Because the Richmond headquarters is centrally located, it also needs two technical support staffers.

Additionally, two dedicated Video Teleconference (VTC) technical support staffers are needed for the existing version of this VADOC tool. Currently this team does not have any administrative support, and this added effort takes focus away from productive tasks. To properly support the current efforts, VADOC would need to increase the Electronic Security staff to eleven, including eight technical support staffers, two VTC staffers, and one administrative assistant. The existing security leadership is not included in these counts and could remain as-is.

Nine of the recommendations in this report have an impact on the Electronic Security team. In any technology-based organization, as more technology is added, more staff will be needed to implement, monitor, and maintain it.

3.3.2 Contrasts of Virginia DOC IT Staffing Levels to Other Commonwealth Agencies

While there is no other Commonwealth agency exactly comparable to VADOC, inferences can be drawn from the IT support levels of some other Commonwealth agencies. Exhibit 1 compares users, IT staff and IT budget among the Virginia Department of Motor Vehicles (DMV), the Virginia State Police (VSP), the Virginia Department of Taxation (TAX), and the Virginia Department of Transportation (VDOT). In the following table, the contrast is stark. VADOC has one of the highest infrastructure costs and lowest staff level to support the applications running on that infrastructure. Even considering that some of these agencies employ a higher percentage of knowledge workers than VADOC and, therefore, require more technology support, VADOC's IT staffing is unusually low.

Agency	IT Staff	Total Users	Staff / Users Ratio	IT Budget	VITA Support Cost	IT Staff Costs	Contract Staff Costs
VADOC	45	13,000[8]	289:1	$34 M	$25M	$3M	$1M
DMV	146	1,622[9]	11:1	$38 M	$23M	$14M	$3M
VSP	262[10]	2,706[11]	10:1	$55 M	$12M	$20M	$1M
TAX	135	3,790[12]	28:1	$32 M	$15M	$10M	$0.5M
VDOT	101[13]	7,247[14]	72:1	$98 M	$57M	$7.6M	$19M

Exhibit 1 – Comparison of IT Budgets and Service Ratios Among Agencies

3.3.3 Level of IT and Technology Support Required to Enable Recommendations

In addition to requiring incremental CTSU staff to support current IT applications and Electronic Security technology, VADOC will need more staff to support whatever additional technology it implements. The actual number of staff needed should be determined by the technology implemented.

Some ideas, such as improved video conferencing, would not necessarily require additional staff. Other items, however, like Active Radio-Frequency Identification (RFID) tracking, might require an increase in IT staff to support the new systems involved and require additional Electronic Security staff for site support of equipment or training.

Other technologies might be supported by the VITA partnership and would not require additional staff, but would increase the current VITA costs for VADOC. CTSU and Electronic Security staffing levels will need to be addressed individually for each technology idea that is implemented along with additional budget to support associated increases in VITA costs.

3.4 Costs of Having Maintained Old Technology

VADOC would have faced ramifications to costs and recidivism programs had it continued to use its legacy systems. Maintenance costs for aging legacy systems continue to rise and the technology that they are built on cannot support the evidence-based practices used in VADOC's rehabilitation programs. VADOC's implementation of VirginiaCORIS and other up-to-date technologies have already enabled the agency to achieve long-term cost savings through its retirement of expensive and inefficient legacy technologies and provided comprehensive data needed by the rehabilitation programs.

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[8] Department of Corrections supports the technology needs of an average of 30,000 offenders each year
[9] Estimated based on (Total Employee costs/average IT salary) where the average salary was calculated from a department with a known IT staff count
[10] Estimated based on (Total Employee costs/average IT salary) where the average salary was calculated from a department with a known IT staff count
[11] Number of users could not be determined. Number of employees as of 2016 was substituted
[12] Departments of Taxation and Motor Vehicles support a large web presence for interfacing with the public population of Virginia
[13] Estimated based on (Total Employee costs/average IT salary) where the average salary was calculated from a department with a known IT staff count
[14] Number of users could not be determined. Number of employees as of 2016 was substituted

3.5 Where the Virginia Department of Corrections Would be Today Without VirginiaCORIS

Prior to implementation of VirginiaCORIS, numerous prison processes were paper-based, and would have remained so without VirginiaCORIS. There was little to no integration between the systems due to outdated technology. In 2005, staffers had to re-enter data in multiple systems because of the lack of integration. Staffers would continue re-entering that data today.

Most significantly, VADOC would not have been able to integrate COMPAS into these legacy systems. As previously noted, COMPAS is the system used by VADOC to assess offenders for prison programs designed to guide offenders into becoming productive citizens upon release. This application is one of the successful elements in the agency's commitment to rehabilitation.

The mobile technologies in use today would not exist. Community Corrections is especially dependent upon VirginiaCORIS Mobile to help in the field. Staffers in these roles would be deskbound accessing multiple systems and paper files to manage their caseloads.

3.5.1 Staffing Required

Prior to the implementation of VirginiaCORIS and VITA oversight, VADOC had 70 people on its CTSU staff. 35 staff members moved to VITA as part of the transition while the other 35 remained with VADOC for onsite application support and help implement VirginiaCORIS. With implementation of VirginiaCORIS, VADOC was no longer investing in enhancing the 25 systems VirginiaCORIS was replacing. Therefore, VADOC avoided expanding the staffing levels required for additional upgrades of these systems. If the 25 systems were not retired, VADOC would have needed to add 17 staff members to provide the required support.

In addition, the change in VADOC architecture associated with VirginiaCORIS has allowed it to avoid significant costs that other agencies have experienced. In comparison, DMV has found that while its support costs to VITA for its mainframe systems have decreased, the support costs to the vendors supplying these systems have been steadily increasing. DMV has seen that companies are retiring mainframe versions of their systems and requiring customers to migrate to newer client server versions. DMV is concerned it will be forced to migrate and does not want to be left with a legacy system that is no longer supported by a vendor. If VADOC had remained on legacy mainframe systems, it would likely be facing the same dilemma.

In 2005, labor costs for IT professionals knowledgeable in the mainframe technologies used by these legacy systems were already increasing as people with that experience were retiring and no one is acquiring the skills needed to take their places. Again, in comparison, DMV is having difficulty finding staff to support its legacy systems and has found those costs rising substantially over time.

As a result, if VADOC had needed to recruit the 17 staff members required to continue fully supporting the legacy systems, it would likely have experienced this same competition for scarce human resources and the associated higher costs. In addition, these costs likely would have continued to rise over time. As the Y2K remediation work in the late 1990's demonstrated, IT professionals with scarce skills very often turn to contracting for gaining maximum leverage from their skills.

3.5.2 Costs to Incarcerate Based on Prior Recidivism Rates

Based on offenders who return to prison within three years of their release, the recidivism rate for Virginia Commonwealth prisons was 27.7% of released offenders in 2006. VADOC released about 12,000

offenders that year. By 2016, the recidivism rate was 23.4%, based roughly on 12,000 releases. The 2016 recidivism rate equates to 528 offenders who did not return to prison. The current average annual cost for Virginia to incarcerate an offender is $28,000; as a result, the reduction in recidivism described above translates to an annual savings of $14.8 million.

If the average of the recidivism rates between 2006 and 2016 is used we can approximate the incarceration savings to Virginia over that 10-year period. During those 10 years, with a high of 27.7% to a low of 22.8, the average recidivism rate is 25.4%, which is an average recidivism reduction of 2.3% from the 27.7% high. For simplicity, the following calculations assume all offenders are returned to prison for a one-year sentence as this is the minimum sentence to count as recidivism. Longer sentences would compound costs for each additional year on an offender's sentence.

$$12{,}000 * 2.3\% = \ 276 \ offenders \ not \ returned \ to \ prison \ per \ year$$

$$276 * \$28{,}000 * 10 \ Years = \$77.3M$$

Without these reductions, VADOC would have been managing a minimum of an additional 276 offenders per year or an additional 2,760 offenders over 10 years at a cost of $77.3 million. Considering that on average, states try to maintain one officer for every five offenders, VADOC would require 83 more corrections officers to fulfill that ratio. In addition, instead of closing facilities, Virginia might have been renovating or building new facilities to house these offenders. As construction of additional prisons likely would have increased the per offender annual costs, the cost of $28,000 per offender used here is probably lower than the actual additional costs the Commonwealth would have incurred.

Virginia's recidivism reduction is a combination of declining crime rates and quality offender education and mental health programs. These programs have had a significant impact on how much Virginia spends on incarceration and have improved the lives of the offenders who have been released and not returned to prison. While these cost savings cannot be completely attributed to the new systems and programs, these systems and programs have contributed to this reduction. These programs would not have been possible without the technology VADOC has put in place to implement and support them.

There is an IT industry consensus that it is reasonable to expect a reduction in costs of $3.50 for every $1 spent on technology that is supported by a strong business case in state government.[15]. This consensus is borne out by VADOC's experience with VirginiaCORIS and other technologies, and supports further technology investment for VADOC.

[15] Patrick Thibodeau, Senior Editor ComputerWorld, December 24, 2014, $1 spent on state government tech saves $3.50, study finds

4 Future of Technology in the Virginia Department of Corrections

With the advent of smuggled cell phones and drones dropping contraband into prison yards, technology has made the job of corrections officers more difficult. Conversely, other new technologies have provided significant gains that can be applied to counter these and other challenges. In some cases, age-old problems now have technology-based solutions because the technology did not exist to counter risks like the smuggling of non-metallic weapons, drugs, and cell phones.

This section is broken into three sub-sections based on the timeframes within which the technology is feasible for implementation in VADOC: Short-Term (1-5 years), Medium-Term (5-10 years), and Long-Term (10-20 years).

Recommended technologies are based on the corrections business needs that they address. Following this concept, under each timeframe is a list of business needs that can be met within that timeframe by investing in and implementing the technology recommendations related to each of those business needs. By confirming that a technology supports a valid business need before implementing it, VADOC avoids the risk of investing in technologies that will not further the programs in place to continue to improve the Commonwealth's recidivism rate.

It is important to note that VADOC does not have the funding or staff needed to implement any of the technologies presented in this report. Any implementation of additional technology to support VADOC business needs will need to be supported by funding for the technology, programs, and the IT and Electronic Security staff needed to implement and support the required technology.

4.1 Technology and Programs for the Short Term (One to Five Years)

Technology listed in this section exists today and is available for immediate application. VADOC does not need to wait for the technology to mature further before applying it to meet VADOC business needs. This study does not recommend that every technology idea listed here should be implemented immediately. Each idea is considered individually without analyzing dependencies on other technologies. To properly manage implementing one or more technologies listed here, VADOC would need to plan how to stage the implementations over multiple sites over a longer time and apply the appropriate Organizational Change Management (OCM) practices to ensure VADOC employees are notified, involved, and trained as needed for each new technology.

4.1.1 Comprehensive National Criminal Information Access

Information sharing is key to helping investigations, trend analysis, and improved evidence-based practices. There are also times when people and organizations outside of VADOC have a legitimate need for corrections information, but are restricted from accessing it directly from the department's source systems.

4.1.1.1 Supporting Technology – FBI N-DEx System

The FBI is creating a nationwide data sharing platform called N-DEx. This effort is designed to receive data from all over the nation and provide it in a centralized location. VADOC wants to feed information collected within its OMS to FBI N-DEx to use this nationally available system for VADOC needs, to feed information to assist other agencies within expanding their institutional knowledge, and to provide access to VADOC offender data to individuals or other agencies without providing access to VirginiaCORIS.

The first two uses are standard. The third use provides safety gains to VADOC as it allows access to VADOC data without providing access to the systems containing the data.

VADOC's technology needs for this recommendation are the resources to create and implement an interface between the VADOC systems, particularly VirginiaCORIS and N-DEx. Along with the costs of implementing this recommendation, VADOC will need ongoing funds to support and enhance the interface as it evolves and changes over time.

4.1.2 Insight into Community Corrections Offenders Between Visits

Community Corrections understands that the snapshot views they get of offenders in the probation office are not always the most accurate view of the true mental state of the offender and they would like to gain insight into an offender's state of mind in between visits to address this issue. If Community Corrections can detect an escalation of aggression or other troubling signs, they can intervene and prevent an offender from committing another crime.

4.1.2.1 Supporting Technology – Social Media Monitoring

Tools are available that can monitor the public postings by individuals on social media. Using these tools, probation officers could monitor posts made by higher-risk offenders and detect indications that signal that their intervention is warranted.

Use of this technology is not without controversy. While social media posts are generally viewed as public, social media sites have taken exception to their sites and data being used for these kinds of targeted searches. One vendor lost access to social media feeds after it was revealed that they were supplying the information to police officers who then used it to stay a step ahead of protesters who were using social media to organize their events[16].

VADOC would need to review the technology to learn if its proposed use would generate the same reaction from social media providers. If the review confirms that VADOC's proposed use would be acceptable, VADOC could then perform a vendor selection to find the social media mining company that would best suit this purpose. It is likely that integration with VirginiaCORIS will not be necessary as any findings would be better suited to a probation officer update of an offender record. VADOC would need designated funding to perform the review and to act on any positive review findings.

4.1.3 Enhanced Perimeter Monitoring

Prison facilities face significant challenges in securing their perimeter boundaries, including security threats from both inside and outside. Advances in technology, especially readily-available drones, are not impeded by the traditional methods for securing prison fences. Drone breaches have already occurred at facilities around the country[17]. Prisons face threats from devices as simple as the T-shirt shooters from sporting events as these can easily launch contraband over a fence for easy retrieval later by an offender.

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16 Selina Larson, CNN tech, October 11, 2015, Facebook, Twitter block social media surveillance tool

17 Elisha FieldStadt, NBC News, October 27, 2015, Drone Carrying Package With Drugs and Blades Found in Oklahoma Prison Yard

Conversely, corrections facilities devote an inordinate amount of resources to perimeter patrols. VADOC believes that with proper funding, it can retire most if not all perimeter patrols within 36 months of approval to implement the following recommendations. This change would allow facilities to re-focus corrections officers who would normally patrol the grounds back to the offender population, and increase their productivity, while still providing superior perimeter protection. Facilities would reduce overall usage of vehicles, which would reduce wear, damage, and maintenance costs. Transportation funds could then get re-allocated to programs to enhance offender transportation safety.

4.1.3.1 Supporting Technology – Drone Disablement

Drones are a real threat to prison security and have already been used to deliver contraband directly to offenders. As technology improves, the capabilities of drones continue to increase. Radar technology can detect an inbound drone and the detection can be a trigger to mobilize staff to intercept the drone should it set down or drop something to the facility grounds.

There are several devices designed to intercept drones. A company in Japan has developed a net capture system[18]. Another company has developed a directed-energy weapon that can quickly capture and land a drone without collateral damage or use of projectiles[19].

Currently, however, prisons are unable to use these technologies to defend against drones. It is against federal law to down a drone, even if it poses an imminent threat. Only federal agencies can get a waiver for legal protection. To counter these threats, VADOC needs help from the Governor and the General Assembly to pressure the Federal Government to address this issue. Commonwealth agencies face the same risks as Federal Agencies and should have access to the same security measures.

4.1.3.2 Supporting Technology – Radar/CCTV Surveillance

Radar can detect all potential intrusions and operate in any weather. Modern radar systems with integrated CCTV can detect and immediately focus cameras on and record any target within their range. Properly installed, a radar system can distinguish between drones, vehicles, people, and animals and identify the speed and direction of the target to better identify if a target is passing near or approaching a prison facility. Integrated cameras can track multiple targets at once. Depending on the facility location and surroundings, the radar range can extend beyond the perimeter fence to alert staff long before the threat reaches the boundary. Radar is susceptible to jamming, but because of the type of radar used in security, jamming is difficult and unlikely to completely block the entire 360^0 sweep of the device.

As security radar does full sweeps, security can also be aware of offenders or other persons approaching the perimeter inside the facility and can then monitor them remotely as well. If necessary, an entire facility can be monitored by radar using multiple sensors.

This technology has matured and is readily available today. Coupled with the recommendations for 4.1.18 Reduced System Outage Rate at Remote Sites, multiple facilities could be monitored remotely by a smaller staff and still provide the same security enhancements. VADOC would need funding to assess what tools are in use by companies and universities today to understand what would work best for the

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[18] Nikkei Asian Review, December 11, 2015, Tokyo metro police to use nets to snare suspicious craft

[19] Batelle DroneDefender, Company Website, Battelle DroneDefender™

unique prison environment. Funding for implementing a selected technology would need to consider support and system training staff.

4.1.3.3 Supporting Technology – Drone Surveillance

While drones represent very real threats in the corrections environment, they can also be a valuable tool. Every facility must perform full property surveillance and doing so currently involves officers and vehicles. Along with consuming substantial personnel time, the vehicles require fuel and maintenance, at substantial cost.

Drones can reduce the cost of perimeter patrol by performing regular patrols over a large area in a shorter time than vehicle patrols. Additionally, because of their altitude, drones provide a better situational view through mounted instruments including visual and thermal cameras. They would provide a superior overhead view of offender populations when they are outside of the buildings. With this improved situational view, potential security issues can be pinpointed by drones and investigated further by officers.

Drones are susceptible to interference and can also be hacked and taken down, particularly RF-controlled drones. There is, however, an emerging market of autonomous drones that allow the operator to plot a course for the drone to perform a sweep untethered to a remote control. Using numerous alternate flight paths helps reduce the chance a regularly flown path can be exploited to compromise a drone.

While this technology exists, it is not as mature as radar technologies and drone technology would be best deployed after radar was in place and protecting all facilities. Drones could then be applied where needed to provide further facility security enhancements. VADOC would need funding for not only the drone technology, but also for the required specialized flight and maintenance staff for each installation using drones.

4.1.4 Improved Offender Transportation Safety

Transporting offenders between prison facilities and other locations, such as court or medical treatment facilities, is another high-risk activity in offender management. There is limited staff during transportation, and there may be no access to immediate help should an issue arise. There is also only a transport vehicle as a perimeter for protection. Currently VADOC does not have any method to detect whether a transport vehicle is in danger, disabled, lost, or if it is proceeding according to its schedule. Someone on the scene must notify the department directly if problems arise, and there are numerous scenarios where that may not be possible. To increase real-time awareness and transportation safety, VADOC has considered equipping vehicles to provide real-time tracking to quickly respond to unscheduled stops, course deviations, or altered arrival times. These real-time GPS trackers and vehicle parameter telemetry monitors have long been standard equipment on commercial transportation vehicles.

The recent prison bus escape in Georgia highlighted this security risk for corrections officers. Offender transportation presents one of the greatest risks to both the public and to the officers involved. The following recommendations offer the potential to both prevent (remote video monitoring) and quickly respond to this kind of attack on corrections officers (real-time vehicle tracking).

These solutions are available today and could be managed from a central location for the entire prison system. Implementation of any solution would not require an inordinate amount of time unless

integration with an existing VADOC system is required. The entire fleet could be outfitted within 12 months if integration is not a consideration and if the necessary funding is appropriated.

4.1.4.1 *Supporting Technology – Real-time Vehicle Tracking and Fleet Management*

Fleet management has been in use by trucking and bus companies for many years. Numerous companies offer real-time GPS tracking, including map overlays. Several vendors also include panic buttons as part of the system. Vendors also allow planned routes with specified arrival times and notifications of route deviations and voice communications with vehicles when alerts are received. The system operates using existing cellular and GPS networks.

Had this technology been implemented in Georgia, the Georgia prison bus escape would have triggered an alert for an unscheduled stop or have provided an officer with access to a panic button to alert the remote officers that an incident was in progress, allowing these remote officers to respond and dispatch local police to the exact location of the escape.

4.1.4.2 *Supporting Technology – Real-time Vehicle Cabin Video*

Vehicle and body cameras for transportation officers exist and are readily available for installation. Real-time cabin monitoring is also available with some fleet systems. Those designed for buses are more likely to provide this feature along with GPS and route tracking. These systems can offer low-resolution video for live streaming and higher-quality video stored for later retrieval. In the Georgia prison bus incident, an officer remotely monitoring the bus camera might have been able to catch the offender's actions before the officers on the bus and alerted them to the suspicious behavior using the voice communications provided as part of the real-time vehicle tracking recommendation.

4.1.4.3 *Supporting Technology – Offender Tracking*

Offender tracking in transit can include use of Active RFID, the technology recommended for tracking offenders inside facilities. Offenders can be checked on and off vehicles at any destination. This topic is covered in more depth in Section 4.1.10 - Comprehensive Offender Tracking and Monitoring.

4.1.4.4 *Supporting Technology – Improved Offender Transportation Logistics*

As already noted, Offender Transportation is both risky and expensive. Reducing the frequency of transportation and planning better, more efficient routes can improve safety by reducing expenses. As research for this report did not find any tools available at this time designed for managing this type of transportation, further investigation may be warranted.

Proper and effective transportation logistics have saved the freight industry significantly as fuel costs have increased. The tools the freight industry has developed over time to efficiently and effectively plan transportation routes can provide a starting point to building tools to help better plan offender transportation. VADOC would need to commission a study to investigate transportation logistics and its potential application to offender transportation.

4.1.5 *Increased System Availability, Scalability, Redundancy, Accessibility*

VADOC wants to increase the availability, scalability, redundancy, and accessibility of the systems it supports without sacrificing the security that has been implemented across the Commonwealth. Given VADOC's needs for continuous technology availability to support its mission, these features are important for both existing technology and any new technologies implemented.

4.1.5.1 Supporting Technology – Cloud-Based Computing

Cloud computing has grown from a niche market to a mainstream delivery method for both industry and government. Many software vendors are now no longer offering licenses and on-site installations, but instead are providing their products on a subscription basis, or as Software as a Service (SaaS).

Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) are two other cloud offerings that further support moving away from local servers and infrastructure to a model in which a service provider provides a virtual environment for a client's application(s) to exist and run as if locally hosted. To provide clients with assurance that their services are secure, cloud service providers acquire and maintain security certifications to ensure they are compliant with standards like Cloud Security Alliance (CSA) and FedRAMP[20].

In Virginia, however, agencies face numerous obstacles in taking advantage of cloud computing. First, to ensure that agencies implement cloud computing securely, VITA has developed a Hosted Environment Information Security Standard (SEC525).

The challenge posed by SEC525 is the VITA requirement that every hosted environment vendor certify its compliance with SEC525 at their own expense, and that they do so repeatedly for each Commonwealth Agency application for which they provide hosting. VITA enforces this requirement even though virtually all these vendors have certified their compliance with more stringent standards than SEC525, such as CSA and FedRAMP. As a result, many vendors are reluctant to or refuse to meet the VITA compliance standard, making it difficult or impossible for Commonwealth agencies like VADOC to obtain cloud computing resources from these vendors.[21]

In addition, agencies are burdened by cloud service charges from VITA. These charges include one-time fees and hourly consulting charges involved with the vendor certification process as well as a recurring $900 monthly fee for each cloud-based application[22]. These fees can negate the savings that agencies realize by moving to cloud-delivered services. It is, moreover, unclear to agencies what value-added services they receive from VITA in return for these charges.

Virginia is working to be at the forefront of cloud services as a place where vendors locate their data centers[23]. Right now, agencies are unable to reap the benefits and rewards of those services because of the constraints put on accessing these services. The COV Information Security Officers Advisory Group (ISOAG) should work with the Chief Information Security Officer (CISO) of the Commonwealth and the Chief Information Officer (CIO) of the Commonwealth to implement cloud computing security requirements that meet the business needs of COV agencies and the security needs of the

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[20] Cloud Security Alliance, Security, Security, Trust & Assurance Registry; FedRAMP, Cloud Service Providers

[21] DOC has received push-back from a vendor that the certification process was cost-prohibitive and required divulging internal and proprietary information. DOC ultimately received a waiver from VITA, but the certification and procurement process have taken 13 months so far and have consumed resources that could be better spent implementing the solution.

[22] VITA IT Services Catalog, Enterprise Cloud Oversight Services (ECOS)

[23] Brian Coy, Suzanne Clark, Microsoft Corp., November 9, 2016, Governor McAuliffe Announces 44 New Jobs and More than $251 Million Investment in Mecklenburg County

Commonwealth, in accordance with the Commonwealth's goal of implementing its security program "in a manner commensurate with sensitivity and risk."[24]

VADOC has begun exploring the migration to cloud-based computing with a single implementation of electronic health records, a SaaS electronic health records solution. Fully migrating all VADOC applications to cloud-based services would take between three and seven years to address all the technical challenges involved and would require targeted funding for each application migrated.

4.1.6 Inventory Control

Corrections facilities need improved methods for managing inventory so that less time is spent on administrative tasks and more time is spent managing the offender population. Like any other business, corrections facilities need to manage their inventory. But corrections is not like any other business and managing inventory can be problematic due to the scope of the inventory to be managed.

This scope includes fixed assets like equipment, beds, PC's, etc. In addition, there are multiple stockrooms for consumables like bathroom supplies, lightbulbs, cleaners, and food for the cafeteria. Some equipment and tools are also designed for common use and require check-out and check-in capabilities. Management of common-use equipment is further complicated if offenders have shop privileges or handle maintenance of the facility. Additionally, VADOC operates Virginia Correctional Enterprises (VCE). This program provides prison jobs that produce goods and services. This enterprise operates as a business with raw materials, production equipment, and produced products for sale. This adds a layer of complexity to inventory management.

Implementing inventory control across all facilities would take 24 to 60 months as significant training and process changes would be needed to manage the offender-level changes. Funding would be needed to support each implementation and include allocations for staff and training.

4.1.6.1 Supporting Technology – Bar Coding

Bar-coded inventory is commonplace and is also the method of choice for Amazon[25]. Every item needing tracking is marked with a printed tag. A single tag is used for inventory tracking as well as any equipment and tools requiring check-in and check-out.

A major drawback to barcodes is that they are very susceptible to wear and tampering. Each tag must be individually scanned, so entire pallets or stacks of would have to be broken down to allow access to each tag. Using tags for check-out and check-in also requires individual scans, but because inventory can be immediately reported on, missing items can be identified quickly before anyone leaves the area.

4.1.6.2 Supporting Technology – Passive RFID

Passive RFID offers a few improvements from bar codes. Readers only need to be in proximity to a tag to read it and can usually read tags in large numbers to quickly verify inventory of even entire pallets of goods. Tamper-resistant and tamper-evident tags are available to help prevent inventory manipulation.

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[24] Commonwealth of Virginia, Information Technology Resource Management Information Security Standard (SEC501-09.1), p. 2.

[25] Nancy Master, RFgen, November 27, 2012, Amazon's inventory management secrets

Cost is a major factor in using RFID for inventory control. These tags cost more than a printed barcode and prices go up when any tamper-control technology is needed.

4.1.6.3 *Supporting Policy – Managing Assets in the Cloud*

VADOC researched tools and engaged a highly-rated vendor for cloud-based asset management to automate inventory management. With staff, equipment, and property across Virginia, and some very large facilities, providing a cloud-based service with mobile technology provided the flexibility VADOC needed to manage its assets. Features like barcode scanning and printing, GPS monitoring, repair tracking, service contracts, depreciation, insurance records, notifications, and asset check-out and check-in made this solution the tool of choice. This vendor was also the price leader, providing unparalleled capabilities at a lower price point.

When the VITA requirements for using cloud-based services were presented to the vendor, the vendor declined the contract. The vendor could not financially justify going through the process to do business with VADOC. VADOC is now having to engage with a vendor with significantly higher costs.

VADOC should work with the Chief Information Security Officer (CISO) of the Commonwealth and the Chief Information Officer (CIO) of the Commonwealth to implement cloud computing security requirements that meet the business needs of COV agencies and the security needs of the Commonwealth, in accordance with the Commonwealth's goal of implementing its security program "in a manner commensurate with sensitivity and risk."

Cloud computing security policies and procedures should be in place to ensure security and infrastructure are not compromised. They should not make it impossible to do business with best-in-class vendors who already meet nationally recognized cloud security standards.

4.1.7 *Offender Access to Technology to Improve Access to Rehabilitation Programs*

A key factor in VADOC's approaches to reducing recidivism is providing access to educational material and preparing offenders for life outside the prison walls. Since handheld technology and internet-enabled devices are part of everyday lives, VADOC sees providing secure access to similar capabilities to offenders while incarcerated helps prepare them for what they will have when they are released.

4.1.7.1 *Supporting Technology – Tablets*

Several vendors have created tablets specifically for offender populations. In every case, the devices are designed to provide only approved content and to allow no direct connection to the internet. They do provide capabilities like those of smartphones and tablet computers. The following is a list some of the features provided by offender tablets:

Educational Material	Vocational Training Material	Behavioral Training Material
Approved Games	Purchased Music	Grievance Filing
Purchased Movies	Digital Paperwork	Commissary Orders
Secure Messaging and Calls	Sick Calls	Improved access to Medical Staff
Books and Other Reading Material	Offender Account Balance Checks	DMV – Drive to Work Training (Release Planning)

Exhibit 2 – Examples of features provided on offender tablets

Each of the items in Exhibit 2 provides benefits in managing offenders. Education, training, and entertainment lead to personal improvement, preparation for release, and less overall aggression in the offender population. Access to digital paperwork, medical, commissary, and grievance filing reduce staff workload and requirements for offender movement around the facility. In addition, grievances are less likely to be lost by staff when they never pass through a correction officer's hands.

Secure messaging keeps offenders in contact with loved ones outside of prison, which, as noted before, works to reduce recidivism. The use of messaging also reduces staff workload associated with managing correspondence as tablet based communications can easily be stored and referenced. Other items VADOC thought would be aided by tablets include scheduled video visitation and even doctor or therapist visits as an extension to tele-medicine.

While providing offenders in prisons personal tablets may seem frivolous, the use of tablets has already been found to provide positive reinforcement and remove control issues over community room phones, while at the same time providing offenders access to more education and entertainment, which reduces friction among the offender population[26].

In addition, while this program may seem expensive, the program helps offset its own costs. Vendors provide the devices for purchase, at low rental fees, or even at no cost, depending upon the model chosen for each prison. Offenders and family members purchase content, such as music, movies, and books. Revenue from these purchases is used by the tablet vendors to pay for the programs, reducing the overall costs to the institution or agency. Some contracts even provide for revenue sharing between the vendor and the prison or jail system.

As these devices and programs already exist and as Colorado is well on its way to being the first state to implement them state-wide, the technology has sufficiently matured for Virginia to adopt it, once funding and approval are in place. Given the complexities involved in deployment, implementation would likely require at least a 36-month roll-out period. The program should be piloted at one or more facilities initially to make sure program adjustments are completed before a roll-out across the Commonwealth.

4.1.7.2 Supporting Technology – Plug and Play Content Providers

The term Plug and Play has been in use for quite some time and is refers to technology that enables a PC to recognize and integrate a newly-attached peripheral device automatically. In the context of offender tablets, VADOC wants a tablet solution that will allow offender purchased content to always be available to the offender, even if the Commonwealth switches tablet vendors. The reasoning is that the content was paid for and is owned by the offender and their access to it should continue.

This idea developed as VADOC has been in the process of changing its vendor that provides access to purchased entertainment; the current vendor has no provisions for transferring content. VADOC expects losing access to purchase content will be met with frustration by the affected offenders. In addition, this type of change is contrary to VADOC practices for managing its offender population.

The tablet solutions offered by the vendors researched as part of this study are all proprietary solutions. One challenge is that, while some solutions allow the vendors to retain the tablets after they are

[26] Kirk Mitchell, Denver Post, May 9, 2017, 8,000 Colorado inmates have free computer tablets

released, the devices are no longer updatable once the offender has left the prison. Any tablet solution considered needs to take this limitation into account.

4.1.7.3 Supporting Technology – Offender Wi-Fi Network

For tablets to reach their full potential and provide the best return on investment, they will need to have connectivity to access additional content, provide for secure messaging and video calls, download entertainment, etc. Part of the goal of the program is to provide access to the types of devices offenders will see upon release as well as providing easy access to program materials, including from within the offender's cell.

As noted in Section 4.1.11 - Increased Officer Safety and Productivity, a facility-wide network could be set up as two fully-independent network zones using the same access point hardware. This deployment would allow a facility to build a separate network for offenders in tandem with a prison staff network with very little additional overhead, and with reduced funding and staffing needs.

Rollout of this technology should be done as a component of providing a prison staff facility wide Wi-Fi. The infrastructure could be put in place before any roll-out of offender tablets.

4.1.7.4 Supporting Policy – Revenue Generation on Content Sales/Rentals

VADOC currently has a policy in place pertaining to generating revenue that restricts pursuing revenue on offender purchases. VADOC should consider changing this policy to help self-fund technology needs.

4.1.8 Modern Facility Video Surveillance

VADOC has video systems available in all its corrections facilities. Most systems are older analog systems that provide views of secure areas and allow the officers monitoring them to identify incidents. They cannot provide zoom capability and the images are too grainy to allow for recognition of offenders involved in an incident. VADOC needs to fully implement a high-definition video surveillance system to enhance safety as well as to enable VADOC to provide video of incidents as evidence to courts to identify individual offenders.

4.1.8.1 Supporting Technology – High-Definition CCTV Roll-out

VADOC has already invested in high-definition video to build out a modern video surveillance system. To date, the main system, 90-day video storage, and dedicated security network have been built. Several facilities have been brought online to use the new system. Each installation requires a local server for collecting the digital video which in turn transmits the video over the dedicated security network to the main system for centralized storage. This intermediate step avoids any video loss in case of a network outage. A return to service allows the site to resume video transfer for full 90-day storage requirement.

VADOC needs to finish implementing these installations across all prison facilities. Some facilities with the oldest systems will need significant infrastructure changes to properly outfit all offender accessible areas with cameras as well as to place the local servers on-site. More recently-installed analog systems were designed to permit conversion to a full digital system and will need much less work.

Because an average of 275 cameras is required for full coverage of a prison, VADOC would need funding allocated to completely outfit the remaining facilities. Electronic Security would also need additional staff to manage the increased infrastructure that goes with this more comprehensive video system.

4.1.8.2 *Supporting Technology – Comprehensive Video Storage Expansion*

VADOC is currently mandated to save all facility recordings for 90 days. Any recordings material to an incident must be kept for five years. Any mandates extending the 90-day storage period will have significant impacts to VADOC and its video storage volume. The purchased system is currently designed to handle the existing load and as time goes on, will need to be expanded as each site is upgraded. The following calculations provide a perspective of the data volume involved with modern 24/7 high-definition (HD) video surveillance.

Each HD Camera records 2.25 terabytes (2,250,000,000,000 bytes) of video data during a 90-day period. With an average of 275 cameras per facility, each facility generates:

$$275 * 2.25\text{TB} = 618.75\text{ TB}\ (618{,}750{,}000{,}000{,}000\text{ bytes})$$

of video data every 90 days. To save video for 38 facilities for 90 days:

$$38 * 618.75\text{TB} = 23{,}512.5\text{ TB}\ (23{,}512{,}500{,}000{,}000{,}000\text{ bytes})$$

of storage would be required.

This figure represents the requirement to store a single copy of all facility video for 90 days and does not include any additional storage needs for structure needed to reference all the video, provide data redundancy, back-up, or any other storage overhead. Each additional 90-day storage requirement would double this amount along with all the additional storage needed for redundancy and overhead.

Before deployment, VADOC should perform a study on the impacts to the planned facility video storage requirements to learn and build a plan for how this current video storage plan would be impacted by a longer storage requirement, as well as additions of body cameras and vehicle cameras. A combined and comprehensive VADOC video storage solution could then be created to handle the volume of storage required by all video devices. Funding and staffing for this could be incorporated with fully implementing the High Definition Camera installations.

4.1.9 Cell Phone Use/Misuse Prevention

Cell phones and prisons can be deadly combination. On at least one occasion, a murder for hire was commissioned using a cell phone smuggled into a jail[27]. Corrections officers have also been targeted. VADOC wants to impede the use of smuggled phones so that if a device is not confiscated, it is useless to an offender.

4.1.9.1 *Supporting Technology – Managed Access Services (MAS)*

Managed Access Services (MAS) is a cell phone network for a specific facility. All cell signals are routed through this service instead of through the carrier cell networks. Since no signal jamming is in place, there is no conflict with cell companies and no need for FCC approval. For a cellular device to work, it must be identified within the MAS. Once authenticated by the MAS, a cell device is then passed on to

[27] Associated Press, April 17, 2009, Man Convicted of Witness Hit Ordered on Contraband Cell Phone While in Jail

the network carrier. Since contraband phones would not be identified to MAS, the devices would not be passed on to the network carrier, rendering the device useless.

This technology is readily available for implementation and is offered by several vendors. Cost is the factor limiting implementation, as the implementation for each facility needs to be individually designed and executed. Because of the structure of prison buildings limits the range of cell phone signals and because some facilities have extensive footprints, the amount of equipment needed for coverage is very high.

In addition, as cell phone technology is advancing continuously, future generations of cell phones are likely to be operable in portions of facilities that are out of reach of current cellular technology. It is therefore necessary to plan for full facility coverage to future-proof against improving technology. VADOC would need funding for each installation and ongoing annual funding to support the technology, licenses, and required staffing over the life of the equipment.

4.1.9.2 Supporting Technology – Better Contraband Detection

The best way to prevent cell phone use in a facility is to prevent the devices ever from entering a facility. New scanning systems using technology like those available to TSA are on the market and becoming more common in prison contraband detection programs. The Enhanced Contraband Detection section of this document goes into more detail on improved detection devices.

This technology is readily available and has started rolling out to facilities. The cost of each detection system is a limiting factor to faster roll-out. While the detection systems greatly improve the detection of metallic and non-metallic items, as well as contraband smuggled in body cavities, operators do need time and training to better detect items such as powered drugs, especially in smaller quantities. VADOC would need targeted funding allocated to expedite this program and pay for the equipment, installation, training, and support staff.

4.1.10 Comprehensive Offender Tracking and Monitoring

Integral to keeping a prison as safe as possible is continuous awareness of where offenders are within the facility. Maintaining this awareness is a very labor intensive and sometimes tedious task. Offenders must be tracked whenever they are moved around facilities, in between facilities, going to meals, going to work, going to medical, moving between buildings, etc. Headcounts are frequent, consume time, and can even disrupt offender program activities.

Active Radio-Frequency Identification (RFID) is a solution available to provide better offender tracking and has been implemented in the Washington, D.C. jail system[28]. Each site implementation would be a multi-year process as designing the system requires fully evaluating each site for range and detection issues. The first site could begin once funding was authorized. Future deployments could then be staged at other locations over time.

4.1.10.1 Supporting Technology – Facility-wide Active RFID

[28] Mike Chavers, The Council of State Governments, Washington, D.C., Jail Uses RFID Technology

Active RFID offers enormous gains in officer productivity and offender tracking. With every offender tagged with a tamper-resistant band and every officer equipped with a portable scanning device, it is possible to know at any given moment where every offender is, to whom they are in proximity, where the closest officer is, and if there is a growing concentration of offenders at any location in the facility. The location resolution is detailed enough to identify locations on each floor in open multi-floored cell blocks. Locations can be displayed on facility maps to assist staff in directing officers if needed.

Headcounts can be taken almost instantaneously. Movement logs can move from paper-based tasks requiring later manual entry to automated pass-by registration points. Incident investigations are enhanced as tracking can show who was near an incident location and at what times. Offender movement between facility buildings can be tracked. This technology could also be considered for providing access to certain parts of the facility to specific offenders while not allowing access by others.

Officer safety is increased as officers do not have to focus on everyone being accounted for and can instead focus on the offenders themselves. Officer devices can also be equipped with panic buttons so that help can be called without alerting nearby offenders. These devices can also detect when an officer goes down and does not return to a standing position.

If mobile officer reader devices are added to the system, offenders could also be tracked during and after transport to other facilities, including court and medical offices.

VADOC would need funding for every facility that implements offender tracking for the installation, training, and necessary support staff. VADOC may also need funding to integrate with VirginiaCORIS to automate updating offender records for offender movements and incident tracking.

4.1.11 Increased Officer Safety and Productivity

Security Officers working in facilities need to be able to access much of the same information as Probation Officers, but do not have access to that technology when they are physically present within the cell blocks and other offender-populated areas.

4.1.11.1 Supporting Technology – Body Cameras

One of the largest and most valuable changes in officer technology today is the body camera. These units provide accurate and unbiased documentation of incidents for police officers, security guards, and across industries. Baseless accusations can easily be disputed based on the camera footage recorded.

Currently, VADOC officers use hand held cameras when they know they are going to have to work with an uncooperative offender. This procedure protects both the officers and the offender should the incident escalate and require investigation, but requires an extra officer to operate the camera and only provides a single view angle.

Body cameras would remove the need for a bystander officer and allow that officer to focus on other tasks or provide additional support during a potentially unsafe interaction and provide constant coverage. Probation officers could also benefit from body cameras when meeting with offenders during community corrections visits, especially if VADOC moves to an office-less probation model that puts these officers in the workplaces and homes of high-risk and potentially dangerous offenders.

The benefit of these devices has been proven in real-world examples and they are readily available for implementation across VADOC's correctional facilities. The biggest hurdle for cameras is long-term video

storage. This topic is addressed as part of the Modern Facility Video Surveillance technology recommendation in Section 4.1.8 - Modern Facility Video Surveillance.

VADOC would need funding for the devices, training, and support staff. Additionally, increased video coverage will require additional video storage, with attendant increased costs.

4.1.11.2 Supporting Technology – Mobile Devices

Security officers have constant and direct contact with much of the offender population, yet have the least access to the offender systems. Mobile devices can change that equation and provide officers quick access to offender information when needed and allow access to provide timely updates to offender data instead of waiting until they are able to access a PC at another time.

Several vendors provide mobile devices for officers, but their solutions tend to be driven by the main product the vendor is providing. These devices are often too large to be handled easily and can prevent an officer from having both hands free when interacting with offenders.

Ideally, a useful officer device would be a large format smartphone or small tablet that would be available when needed but storable on the officer's uniform when not in use to allow for freedom of movement. The device would need to offer physical access security to prevent offender access and for the device to become completely disabled if removed from the officer's person.

At the time of this report, such a device does not appear to be available. Such devices will potentially be available soon, however, as the number of devices meeting the size, connection security, and impact durability requirements are available. They critical missing component is the capability to prevent offender access and disable the device upon removal from the officer. This feature is key in an instance where an officer is actively using a device and is attacked. The offender would have immediate access to the systems. A disable feature would immediately render the device inoperable and cut off access.

In some cases where officers are in central areas and in an environment supported by multiple officers, standard tablets with impact resistance and connection security could be used to provide access to VirginiaCORIS and other applications without the need for a disable feature. Wi-Fi or a Managed Access Network would be needed for connectivity.

This technology is not a short-term solution, but is a significant need for corrections officers. The short-term aspect for this recommendation is reaching out to corrections systems suppliers to propose the idea as an extension to their current offerings so that they could be available in the next five to ten years.

4.1.11.3 Supporting Technology – Corrections Facility Wi-Fi

Access to mobile technology requires a Wi-Fi or cellular enabled environment. The 4.1.9.1 - Supporting Technology – Managed Access Services (MAS) recommendation would provide similar access to Wi-Fi. Either solution presents challenges. Prisons are constructed for safety and security and the materials used interfere with any kind of wireless transmission.

Computer networks are easily expanded with multiple routers and access points and all the equipment is readily available and in some cases designed to be durable for harsher environments. Additionally, with the possibility of offender devices, any considerations for building out a facility-wide Wi-Fi network would need to plan for a simultaneous dual band solution. This solution would allow a single

infrastructure to provide two independent networks with corrections staff on one network and offenders on a second. This avoids doubling the infrastructure cost and mitigates interference from two separate Wi-Fi systems within the same physical area.

Funding would have to address the network installation and maintenance costs, network servers, and support staff costs. Future budgets would have to include necessary server updates and upgrades to prevent the equipment from becoming obsolete and a potential security risk.

4.1.12 Single Source for All Offender Information

Maintaining offender based data in multiple systems or on manual logs requires providing access to multiple systems and paper documentation and leads to mismatched and inaccurate data and productivity losses. VADOC wants to continue to improve efficiency and data quality by migrating all offender based data from manual processes and siloed systems into VirginiaCORIS.

These enhancement requests for VirginiaCORIS could begin as soon as the vendor can build them into their schedule and VADOC can schedule staff to support the requirements, testing, and implementation.

4.1.12.1 Supporting Technology – Additional Modules in VirginiaCORIS

While most offender-based data and processes have been moved to VirginiaCORIS, there is a list of enhancements waiting to be implemented. A few of the larger of these enhancements are noted here. As stated earlier, VirginiaCORIS has been mostly self-funded by the Department of Corrections through providing prison beds to other states and applying the income to the development budget.

1. Meal management addresses dietary needs for offenders and ensures proper nutrition is delivered as mandated by the Commonwealth. The technology support required by meal management is currently provided by a separate system, which is not suitable to be integrated in VirginiaCORIS. Ideally, this functionality should be incorporated as part of VirginiaCORIS.
2. Offenders are periodically required to sign for services or to acknowledge notification; these are both manual processes. VirginiaCORIS provides for digital signatures and as this technology has been found to meet the legal requirements of a physical signature. VADOC would like to incorporate this functionality with the ability to digitize all the required signatory documents and notifications and enable them to become part of the digital history of the offender. Adding this functionality will remove a significant burden of paperwork management, including documentation transfer when offenders move between facilities.
3. Prison operations are filled with the need for logs and logbooks. Some are specific to operations, while some are directed at managing the offender population. Any logs tied to an offender, such as class attendance, movement, bed check, medical check, etc. should be migrated to VirginiaCORIS and include the ability for corrections officer signoff and to add historical data to each offender's history. 4.1.10.1 - Supporting Technology – Facility-wide Active RFID can easily be coupled with digital logs as part of the integration of the tracking solution.

VADOC has continued to build out new modules within VirginiaCORIS as it has been able to find funding. VADOC needs targeted annual funding allocations specific to VirginiaCORIS to keep this vital application growing to meet the needs of the programs in place to support further reducing recidivism in Virginia. Funding must also consider adequate staffing levels to support the application growth.

4.1.13 Enhanced Tele-visitation

Evidence-based practices have shown that frequent positive contact with family and other approved visitors helps offenders better transition to life outside of prison and is a contributing factor to reducing recidivism[29]. A comprehensive visitation policy would include locating offenders closer to their families whenever possible, setting visitation schedules that can accommodate many different work schedules, and providing a more welcoming visitation environment. Implementing such improvements, however, must never negatively impact the safety of a facility.

4.1.13.1 Supporting Technology – Offender Devices and Service Scheduling

While in-person visitation is an important part of helping offenders keep and build community ties, video visitation can provide a platform for more frequent contact without increasing the in-person visitation workload of a facility.

Skype is now ubiquitous as a video call platform. Prisons employ similar technology, but with higher security, including the ability to monitor calls. Like phone calls and in-person visits, prisons monitor these communications as part of their safety protocols. Security must be maintained, regardless of the method of communication with visitors.

The way VADOC would like to better implement this technology is in tandem with the 4.1.7.1 - Supporting Technology – Tablets recommendation. Along with providing access to education and personal entertainment, offender devices like tablets would also allow offenders to have more frequent contact with approved visitors without increasing visitor traffic.

This improvement could be accomplished through a reservation system where a potential visitor could request a time to make a video call to an offender. This schedule would be built around the offender's schedule, including assigned work, education and behavioral classes, and any other limiting factors. With a personal device, the offender would be able to receive the call, engage with family, while the prison would still have the proper monitoring capabilities and be able to interrupt the call should inappropriate or potentially dangerous conversation be detected.

While tele-visitation is in use in VADOC, this recommendation represents a step up in technology and offender technology access and is dependent upon providing portable devices to the offender population, which is covered in more detail in the 4.1.7 - Offender Access to Technology to Improve Access to Rehabilitation Programs section. Enhanced Tele-visitation could be implemented at the same time or rolled out once the offender devices are in place.

VADOC would need funding for the necessary mobile applications and licenses. Staffing impacts would be primarily in the staff that monitors offender communications and would need to be considered as part of funding this recommendation.

4.1.14 Enhanced Contraband Detection

Contraband is a huge threat to the safety of a prison facility. It can endanger staff, offenders, and, in the case of cell phones, even the general population. Better detection is the key to preventing as much contraband as possible.

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[29] Minnesota Department of Corrections, November 2011, The Effects of Prison Visitation on Offenders

4.1.14.1 Supporting Technology – Person Screening

People present the greatest risks in contraband smuggling. Small items hidden on a person, especially drugs, can be difficult to find. Non-metallic weapons are much harder to find than metallic weapons and will not show up with traditional metal detectors. Invasive searches require probable cause and having a detector that can show minute indications can provide the probable cause needed for that more invasive search to find the contraband.

VADOC has begun installing the ConPass systems for enhanced contraband detection. As drugs are the most difficult contraband to detect and as it takes ConPass system operators some time to be able to detect the subtle variations that drugs cause in the scanned images, VADOC is also adding the vendor's DrugGuard detection product to further enhance screening capabilities. Moving to these advanced screening systems removes the need for metal detectors, cell phone detectors, and virtually every other screening device previously needed in the Sally Port areas of prison entrances. This replacement conserves space in what is normally a very cramped area.

While VADOC has begun installing these systems, they are expensive and the capital needed to install them at every facility needing them is not currently available in the VADOC budget. With overdoses from more potent drugs now affecting Virginia, the ready availability of small, untraceable cell phones, and the potential for weapons that are not detectable by current equipment, the rapid and complete roll-out of this technology is necessary to stop the flow of contraband entering through prison doors.

4.1.14.2 Supporting Technology – Shakedown Screening

Portable x-ray systems for scanning beds have been available for some time. Designed for shakedowns, they must be moved around a cell block for each cell to be screened. While the x-ray machines are effective, they are prone to failure from being moved around the harsh physical environment of a prison. A common complaint is that these x-ray machines quickly lose calibration and become unusable. When this occurs, a service call is required to return the x-ray system to service. With prisons in remote areas, it can take an unacceptably long time for that service call.

Advances in US Customs and Border Protection screening tools offer the chance for material gains in portable contraband detection in prisons. The devices used by customs agencies are designed to find items hidden in vehicles, tires, and inaccessible cargo areas. Instead of wheeling around a large portable x-ray machine, corrections officers can carry a small hand-held detector capable of finding contraband in mattresses, books, and in the walls of cells. Companies like Polimaster and CSECO have detectors designed for finding contraband in vehicles and cargo, including inspecting seats, trunks, and doors. These hand-held detectors can also be calibrated on site by trained employees instead of by off-site technicians.

VADOC would need funding to perform a proof-of-concept study to see how well these devices work in VADOC environments and if they can replace the scanners currently used. Such a proof-of-concept study could be performed within three months of funding and if the results support acquiring the new devices, roll-out could begin once full program funding is allocated. With time for officer training, the devices could likely be completely rolled-out within two years of the start of the initial review.

4.1.14.3 Supporting Technology – Vehicle and Cargo Screening

Any vehicle entering the secure section of a prison is a potential path for contraband entry, including VADOC-owned vehicles. An unattended VADOC-owned vehicle off-site can be compromised and then

inadvertently return to the secure facility with contraband to be collected later within the prison by an offender.

Cargo entering a prison must be screened. This screening is currently accomplished using a warehouse approach. Cargo goes to a central warehouse, is unloaded, x-rayed, then re-loaded for delivery. A corrupt or compromised warehouse employee, or anyone who can contact the truck after it has been loaded and before it reaches a prison, can introduce contraband into the prison.

Location-based vehicle screening will help negate these potential threats by allowing cargo and vehicle screening at each facility. Every vehicle entering the secure yard would pass through a local detector using the same technology found in customs cargo inspections.

The greatest advance in this technology has been the introduction of gamma ray scanners[30]. These whole-vehicle scanners can be purchased at a price about 1/20th that of a similar x-ray based system, are as much as 80% less expensive to operate, faster to screen allowing an entire vehicle while it is in motion, and more reliable than the equivalent x-ray devices.

On-site gamma ray scanners could negate the need for x-ray scanners in the central warehouse, but they may not negate the need for the warehouse. If shipments are received, separated, and then shipped out to multiple prison sites, then the warehouse still serves a valuable purpose. Gamma ray detectors could even replace the existing x-ray technology, but the central location would still not prevent the introduction of contraband after the scanning process is complete.

VADOC would need funding to perform a feasibility study to fully research this technology for benefits, costs, and practicality. While this effort could begin immediately upon funding, the actual installation of detectors would have to be planned over time as each facility will need some modification to support scanning vehicles at secure entry points.

4.1.15 Reduced Travel Expenses

Business travel is expensive. Vehicle costs, food, hotels, and the lost productivity of anyone traveling are all additional costs that should be considered. Some facilities require a full day's drive from personnel who need to visit. As a result, three days of travel time may yield only one day of productivity from each traveler.

4.1.15.1 Supporting Technology – Telepresence/Video Conferencing

Video conferencing, which is a mature technology, can help alleviate the need for travel. At one time, video conferencing required a dedicated service line and expensive single-purpose equipment. Some current solutions still use single-purpose equipment while others make use of PC-based cameras and microphones. The bandwidth needed for video conferencing is still quite high. To support the better use of this technology, bandwidth issues detected during network audits across VADOC's operating environment should be used to justify transition to multi-use equipment.

An ideal solution for VADOC would be a video conferencing system that allows for a single remote person to attend a meeting with a group of colleagues who are in an office together, with the remote

[30] General Equipment, Gamma-Ray Inspection System

person having the ability to selectively focus the camera to participate in white-boarding, or to be able to watch an individual presenter in closer detail. The solution should also allow for multiple attendees from multiple locations to participate in tele-conference calls and allow sharing of presentations, notes, and digital white boards. The technology should also allow for virtual classrooms so that a single instructor could teach a class or provide training to multiple attendees at multiple sites, with some of these in remote areas of the Commonwealth.

VADOC would need funding to conduct a detailed study of existing tools available to find a tool that is suitable to the Department's needs and that will meet the requirements noted here while conserving as much communications bandwidth as possible. Depending on the solution, VADOC might find a more cost-effective solution than its current capabilities, allowing re-allocation of resources to enhance productivity elsewhere in the organization.

Telepresence is a term that often is used as a substitute to video conferencing. It consists of capabilities, which now exist, that allow for a remote person to be represented on-site[31]. This technology is relatively new and currently too expensive to consider immediately, but as acceptance and functionality increases and costs decline, telepresence may be a way for VADOC to avoid additional travel costs.

4.1.16 Enhanced Officer Training

VADOC spends roughly $17,000 training a new corrections officer. Ongoing and situational training is always a challenge with officers across multiple facilities requiring the same training not only at hire but also for retraining, readiness preparations, process and procedure changes, etc. VADOC needs to enhance training for continued safety improvements and to make it as cost effective as possible.

4.1.16.1 Supporting Technology – Virtual Classrooms

Universities are currently using virtual classrooms to allow teachers at some locations to provide the same level of instruction to all campuses. This practice allows universities to have concentrated expertise at one location but still make that expertise available to all enrollees. Remote instruction often uses a webinar format, with attendees at individual workstations viewing a presentation with instructor commentary. This presentation method works well for refresher, or informational training sessions that are not dependent upon student/teacher interaction. Webinar software is well established and in use across the Commonwealth today.

The concept of a virtual classroom allows for full interaction between the instructor and all attendees regardless of location. In a multiple classroom setting, students can raise hands for questions, instructors can see every classroom and even zoom in to a single participant. This environment provides a virtual representation of a classroom setting and extends beyond a typical webinar format. Virtual classes would allow a single instructor to teach staff at multiple facilities at the same time and without having to travel to each location. Instruction would be far more consistent and cost effective. VADOC would need funding to assess what tools are in use by companies and universities today to understand what would work best for the unique prison environment. Funding for implementing a selected technology would need to consider support and system training staff.

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[31] Patrick Austin, The Wirecutter, June 1, 2017, The Best Telepresence Robot

4.1.16.2 Supporting Technology – Probation Officer Technology Exploitation Training

For every security technology invented, someone finds a way to work around it. Offenders in community corrections are no different. While many will follow the rules, work hard, and regain their lives, others will try to work around the system and hope not to get caught.

To help probation officers with the investigative side of their jobs, they need training to teach them the methods used to circumvent technology and how to identify signs that an offender is doing that. This recommendation is for a technology training program to better prepare probation officers for the ever-increasing use of technology to track and manage offenders. Funding would be needed for the costs of the training and instructors.

4.1.17 Improved Offender Probation Visit Processing

Probation offices serving heavily populated areas often become overwhelmed with the volume of offenders arriving for their appointments. Limited lobby space and a single receptionist handling both check-ins and offender call-backs create a bottleneck to getting offenders in and out of the office in a reasonable amount of time.

4.1.17.1 Supporting Technology – Automated Check-in Kiosks in Waiting Rooms

If offenders can quickly and easily check-in on a touch-screen kiosk as they enter instead of manually signing a check-in log, the flow of individuals in these offices will improve greatly. The check-in information will be completely accurate and readable, manual logs will not have to move between the offenders checking in and the receptionist needing to use the log to call offenders back for their appointments. The focus of reception then becomes moving the offenders from the lobby to the officers and back out, clearing the lobby quicker, maintaining appointment times, and reducing the negative impact on the offenders.

Ideally, this system would integrate with VirginiaCORIS so that the offender's community corrections interactions are automatically tracked for future compliance review. This technology is very inexpensive and can easily be implemented as a stand-alone solution in key heavily trafficked offices. If Virginia moves to an office-less probation model, this solution would provide a stop-gap solution for the interim years. Funding would have to include the costs of the devices, software licenses, and integration development.

4.1.18 Reduced System Outage Rate at Remote Sites

Many VADOC locations are in remote areas of the Commonwealth. Service interruptions are an almost daily occurrence for VADOC and slow connections are a frequent problem for users at these locations. Full internet outages present both productivity and safety issues for facilities. Productivity is reduced as manual processes must be used during an outage followed by updating the necessary systems after service is restored. These outages also pose a safety issue as Virginia has deployed Voice over IP (VoIP) phone services and these require the same internet connection that is lost in an outage. While most employees have access to a cell phone, the construction used in prison facilities can render these devices useless. When a safety incident occurs, time is the most crucial resource and delays can decrease safety.

4.1.18.1 Supporting Technology – Redundant ISPs

A common solution used today to maintain service when there is an outage from a single carrier is to maintain connections through two separate Internet Service Providers (ISPs), with two separate networks, including the physical cable extending to the site. One connection is maintained as the primary means of Internet access and the second connection is maintained to allow automated failover in case there is a loss of Internet connectivity through the primary connection. While this network architecture does incur more cost, these costs will be offset by reduced downtime and improved safety. A rollout of this type of infrastructure upgrade could mitigate expenses by initially targeting sites with more frequent outages or that pose a higher safety risk from loss of service.

4.1.18.2 Supporting Technology – Increased Bandwidth at All Prison Facilities

Slow connections can have many contributing factors, but they can generally be attributed to two main causes: bandwidth limitations and bottlenecks (which are addressed below). Bandwidth is a measure of how much data can be transmitted over a network in given period, and is usually expressed in bits per second (bps). Network traffic evaluations can help determine where more bandwidth is needed. In some cases, increasing bandwidth can be as simple as a requesting additional bandwidth from the ISP. In other cases, an infrastructure investment will be needed to upgrade equipment and cabling.

Implementation of this recommendation should include:

1. Network analysis to identify facilities where additional bandwidth is required.
2. Prioritization of identified facilities for bandwidth upgrades by facility security requirements.
3. Staged roll-out of improvements based on priority.

The required network analysis is easily conducted. With required funding, VADOC could likely perform this analysis and augment the network within 24 months of commencing the initiative.

4.1.18.3 Supporting Technology – Remove Network Bottlenecks

Bottlenecks occur when too much traffic is routed through a single network point, causing all traffic to slow down to pass through this restriction. Bottlenecks are not uncommon, especially in internal networks like that in use for the Commonwealth.

In the Commonwealth's network, all traffic is required to be monitored, and is routed through a single network node to enable this monitoring, creating a bottleneck. Moving to cloud-based services, exacerbates this bottleneck by adding secure network traffic going outside the network to the cloud service providers to the internal network load.

To address this issue, cloud-based services also can provide Cloud Proxy Services (also called Security as a Service) where users are instead routed to a third-party vendor for traffic monitoring, instead of the traffic monitoring occurring within the network. These vendors can also provide enhanced levels of security, traffic monitoring, and reporting. Additionally, they can provide multiple access points that not only reduce the chances of bottlenecks, but use the exact same security and tracking policies built from a client's specific business rules.

Implementation of this type of security model should be coordinated with the upcoming transition of the Commonwealth's IT outsourcing arrangement to a multi-vendor environment. Security services is one of the vendor "towers" planned by VITA and it would benefit VADOC to determine if the new security services vendors can meet the VADOC needs outlined in this recommendation before acquiring these services on its own.

4.1.19 Comprehensive Information to Support Evidence-Based Practices

VADOC wants to use evidence-based practices to better plan rehabilitation programs for offenders based on how they are classified and what has worked in the past for similarly-classified offenders. Additionally, VADOC wants to also use these practices to improve the programs used for rehabilitation and re-integration. Quality programs are a key ingredient in preventing recidivism.

Another key ingredient is applying the right programs in the right order and the right amount depending upon the classification determined for each offender under the care of VADOC. Knowing how to effectively apply and grow those programs requires having a deep understanding of the successes and failures from prior efforts. This can only be accomplished by creating an environment where all this information is available in a manner that can be digested and understood.

4.1.19.1 Supporting Technology – Business Intelligence based on Data Governance and Data Warehouse

Business Intelligence (BI) is an umbrella term used to describe turning the data collected by an organization such as VADOC and contained within its various systems into information that can be used to improve and guide that organization. Evidence-based practices are built on the information developed with effective BI.

The foundation of BI is the business data. Three key components are needed to ensure the data collected by an organization has the value needed to drive BI: Data Governance, Data Architecture, and Data Quality. At the heart of BI is a comprehensive data warehouse, built using the defined data architecture. This data architecture, in turn, follows the rules and guidelines defined in the data governance framework that was created to ensure the continued quality of the data in the source systems.

VADOC has made great strides in replacing its legacy systems with updated technology that supports this paradigm. The next step for VADOC is to build a comprehensive Data Governance Framework to properly identify the rules, rights, accountability, control, strategy, and metrics needed to enable the organization to reach the goal of using evidence-based practices to guide the organization.

Building this framework requires CTSU and VADOC business units to work closely together to:

- Define ownership and accountability over the data;
- Use data analytics tools to transform the data into the information needed in the data warehouse; and
- Use the information to develop the knowledge required to further advance the effectiveness of VADOC programs.

VADOC will need to incorporate Organizational Change Management (OCM) practices into this process to work with the Research and Forecasting teams. Doing so will bring these teams into the planning and implementation process so that they can adapt their processes to use the data warehouse as a trustworthy source of information. The value of OCM really becomes apparent as the teams that will be the benefactors of a change (Research and Forecasting) become fully engaged with the change as it nears completion.

Establishing a Data Governance Framework is a key first step for VADOC. Many of the recommendations in this study have the potential to generate large volumes of data. In addition, an established Data

Governance Framework will position VADOC to successfully translate this data into information and knowledge. Once a Governance Framework is in place, the existing Data Warehouse structures can be adapted to new requirements and to accommodate any data analysis requirements.

Given proper funding and a mandate, VADOC could likely build an effective governance plan and fully implement Polestars, its current data warehouse, within 24 months of approval to move forward.

4.1.20 Increase Capital Budgets Through Revenue Generating Opportunities

The needs for capital improvement for VADOC always outstrip the funds available. VADOC can potentially develop additional funding to support these capital needs through income-based programs.

4.1.20.1 Supporting Technology – License VADOC Developed Technology

Dingo is a first-of-its-kind canine officer management system developed by VADOC for its own canine officers. This system was built in-house because no commercial product could be found.

VADOC now has a unique opportunity to turn a business need into a valuable revenue-generating enterprise. VADOC has already garnered interest in Dingo from other organizations and the opportunities for a tool like this are almost endless: Police, prisons, jails, TSA, Search and Rescue all use canine officers.

VADOC, however, is in the business of managing offenders and prisons. It is not in the business of creating software products. So that VADOC can focus on its core mission, VADOC should partner with a private company to conduct a marketing assessment of the potential benefit to VADOC of turning its in-house application into a marketable product. Marketing such a product could provide a revenue stream that would allow VADOC to increase technology investment without requiring more allocations from the general fund.

With approvals and policy changes, this effort could begin bringing in licensing fees to VADOC within 18 to 24 months.

4.1.20.2 Supporting Policy

VADOC currently has a policy in place pertaining to generating revenue that restricts pursuing revenue on offender purchases, such as purchased content for offender laptop or tablet computers. A policy change is needed to enable this opportunity.

4.1.21 Support for Mandated but Non-Compliant Technology

The nature of corrections is that maintaining safety is always the first consideration for any idea or program change. With public safety being a key criterion, VADOC is sometimes mandated to provide technology to manage part of their business to ensure that public safety is always at the forefront of every decision, especially when releasing offenders from prison to less restrictive environments. VADOC has found that these mandated requirements can come into conflict with VITA operating policies, which has been problematic for VADOC.

4.1.21.1 Supporting Program – Revision of VITA Policies

One program managed by VADOC as part of community corrections is automated offender check-in services for low-risk offenders. These offenders register with VADOC's vendor using their own smart

phones for GPS tracking, voice recognition, and call verification. This program is integral to reducing community correction officer workloads and focusing efforts towards medium and high-risk offenders.

This information is collected by the vendor's system and is needed by community corrections to confirm offenders are meeting their court-mandated community corrections requirements. VADOC must transfer the offender information to VirginiaCORIS so that it becomes part of the offender's official record.

VADOC has encountered challenges in obtaining VITA approval of this interface. As VADOC must provide confirmation of community corrections adherence and maintain complete offender records, it currently supports the Shadowtrack technology outside the VITA-supported infrastructure, due to the absence of VITA approval. This non-standard support structure not only puts the interface technology at a higher risk, but also puts the data transmitted through this interface at a higher risk. An avenue for VADOC to standardize this support would be to work with the COV ISOAG, the CISO of the Commonwealth, and the CIO of the Commonwealth to identify the steps required for VITA to modify its policies to permit integration of this technology into the VITA-supported infrastructure.

4.1.22 Offender Classification-Based Probation and Parole Model

VADOC wants to move probation and parole to a model that applies the appropriate amount of contact and oversight necessary for the classification of the offender in community corrections. Evidence-based practices show that this model provides more positive results than a model of treating every offender the same regardless of risk. Offenders are treated according to their assessed level of risk to society. This practice supports re-integration for offenders who are working to succeed by treating them more like regular citizens and provides increased contact for offenders who need more direct supervision to avoid re-incarceration.

4.1.22.1 Supporting Technology – Expanded GPS Offender Monitoring

VADOC has already greatly expanded their program for using automated monitoring of low-risk classified offenders to reduce Community Corrections Officer workloads. VADOC would likely increase the use of the traditional GPS tracking to support a more robust classification-based probation model. An evaluation of VADOC's current vendor would be needed to confirm an increase in need would not interrupt service.

As VADOC already has technology in place, an evaluation for expansion could begin immediately with funding and approval. Probation officer workload reductions could be realized within the next 12 months.

4.1.22.2 Supporting Technology – Mobile Officer Devices

VADOC employees have access to Surface Pro tablet-based touch screen devices with the capabilities of Microsoft Windows in a smaller and more portable form. The current implementation of this technology, however, has disabled much of the functionality that makes these devices useful to VADOC. Additionally, the support model for these devices does not provide software updates in a timely

manner[32], which puts the devices and any connected network at risk. An avenue for VADOC to obtain the required support would be to work with the ISOAG, CISO of the Commonwealth, and the CIO of the Commonwealth to identify the steps required to resolve these issues.

VADOC would need 12 to 24 months to plan and implement further changes to VirginiaCORIS Mobile with the vendor. These changes would need to be in place before transitioning staff from office-based probation to office-less probation to be sure they have access to everything they would need.

VADOC already has Surface Pro tablet computers deployed throughout its organization. With a mandate and funding, the issues could be resolved between VITA and the suppling vendor within one to two years.

4.2 Technology and Programs for the Medium Term (Five to Ten Years)

Technology listed in this section exists today but requires a significant amount of planning and time to implement, is dependent on a pre-requisite that must be complete prior to applying the technology, or is dependent on significant efforts from another agency or external entity with priorities that are not aligned with VADOC. These ideas will take coordination with one or more agencies and require updating or replacing existing systems. To properly manage implementing one or more technologies listed here, VADOC would need to plan how to stage the implementations over multiple sites over a longer period and apply the appropriate Organizational Change Management (OCM) practices to ensure VADOC employees are notified, involved, and trained as needed for each updated technology.

4.2.1 Better Data Sharing Across Commonwealth and Federal Agencies

As a matter of daily business, VADOC systems need to interface with multiple agencies and systems across both the state and federal governments. In some cases, interfaces are in place and working well. In others, the VADOC systems are capable, but the other agency's systems cannot support robust data sharing or, in a few cases, cannot support any kind of interface or use a completely manual and paper-based process.

VADOC needs to interface with Virginia State Police, Courts, Social Security, Virginia Employment Commission, and the Virginia Department of Health for offender information on a regular basis. Modern interfaces employing real-time or near real-time technology will greatly improve efficiencies for VADOC both internally and in their interactions with other agencies.

Very often this information is needed in real-time. As an example, if an offender is convicted in court and immediately remanded to state custody, the court system must share all pertinent offender information with VADOC. If there is not a real-time interface with corrections, this information will have to be submitted by paper where it is then entered in VADOC systems manually. A once-a-day interface containing all referenced offenders may not arrive before the offender must enter the VADOC systems.

As these recommendations require multiple agency coordination and cooperation, this entire effort will take considerable time to implement fully. Better data sharing with federal agencies will be much more

[32] Brandon Records, April 11, 2017, Documentation Updates for Surface and Windows 10 LTSB Compatibility

difficult. Their focus is on supporting their programs across the country and not on the interactions needed by individual Commonwealth agencies.

4.2.1.1 *Supporting Technology – Interface Standardization*

According to a 2017 IJIS Institute study, the public safety mandate of corrections is cooperation with other agencies, law enforcement, and courts[33]. Integral to this cooperation is the ability to share information between these agencies easily and effectively.

In Trend #6: Expanded Information Sharing, this study recommends defining and implementing a multi-agency interoperability framework to standardize system communication, which will in turn reduce the cost of maintaining and creating interfaces between criminal justice systems. This study identifies Project Interoperability and its published IS&S Playbook as best practices for building interfaces. The key is to have a single set of standards for all players so that productivity is maximized and costs are minimized. Implementing standards can in some cases also extend the life of legacy systems if these systems are able to adapt.

Acting on this recommendation would be the first step in better data sharing across Commonwealth agencies. The best course is to review available standards and frameworks and adopt one without altering it. Because criminal justice agencies are in the business of criminal justice and not designing IT standards, using a packaged standard makes it easier to adapt when changes to the standard are warranted and driven by the defining entity.

VADOC would need to facilitate creation of a council with all COV criminal justice agencies to review all framework alternatives and come to a consensus on one that best suits their needs. Once a framework is chosen, all COV criminal justice agencies will need to work together to modify existing interfaces to the new standards. All future interfaces would follow the approved standard.

4.2.1.2 *Supporting Technology – Department System Upgrades*

While working to build better interfaces among systems, agencies will need to modify systems to support the accepted interoperability framework. These system updates may include:

- Modifying existing interfaces to follow the new standards
- Creating new interfaces to meet other agency data sharing needs
- Modifying system components to collect and provide data to or receive from a new interface

While some agencies can receive VADOC data electronically, VADOC receives data from these agencies on paper and only after paying fees. These paper-based interfaces are extremely inefficient, resource intensive, and slow based on the need to physically transport the paper reports. VADOC should encourage agencies that provide paper-based data to develop electronic interface capabilities and to reciprocate with VADOC by providing the data without charge.

[33] IJIS Institute, March 2017, Corrections Tech 2020

4.2.1.3 Supporting Technology – System Replacement

When a system is unable to support required data communications, it is no longer meeting the business needs of the agency it is supposed to support. Some agencies are currently maintaining obsolete systems that are not able to provide electronic data exchanges with other agencies or cannot provide data exchanges using methods commonly used in modern client/server or cloud-based systems. The Commonwealth would benefit numerous agencies, including VADOC, by providing funds for agencies to update or replace their obsolete systems.

4.2.2 More Cost-Effective and Better-Quality Healthcare

On average, states spend $6,047 annually per offender on healthcare[34]. In addition, the cohort of offenders over the age of 55 in prison populations has increased up to 234% and these offenders are likely to have more chronic medical conditions, further increasing costs. On top of these expenses, VADOC faces constant difficulties in supplying health and mental care staff at its facilities as prisons are not considered desirable working environments by medical staff. Working with offenders does come with the possibility of physical threats, and it is not uncommon for these risks to materialize, especially for mental health professionals[35].

4.2.2.1 Supporting Technology – Telemedicine

Texas has implemented a relatively comprehensive telemedicine program[36]. To support these efforts, it placed 200 customized telemedicine units in prisons. These units can also include common tools like stethoscopes and otoscopes and transmit readings to remote doctors. With a facility nurse or aide present, a doctor or specialist can perform a complete exam of an offender. Texas has also found that it is able to recruit more doctors and specialists because they are no longer required to go to the prisons to treat the patients in person. Therapists may still be threatened, but the safety concern is diminished because the threat is made at a remote distance. As of the January 2016, Texas was spending $3,805 annually per offender on offender health care, which is just over 60% of the national average.

Similarly, Riker's Island in New York switched to telemedicine for infectious diseases, gastroenterology, and urology specialties and found that health care was improved because offenders did not have to be transported and kept shackled or in holding cells, only to spend five minutes with the doctor[37]. Offenders were more relaxed and therefore more cooperative and physicians could focus on assessing the patient.

The quality of the telemedicine equipment, including high-definition cameras with zoom capabilities have made this technology perfect for prison environments. More doctors and therapists with a desire to help but no desire to go to the prisons become available, prisons reduce offender transportation costs which improves safety, and prison systems can have less medical staff on site while still providing better healthcare quality at a lower cost.

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34 CTEL News, October 31, 2016, Telemedicine Behind Bars

35 Michael Ollove, The Pew Charitable Trusts, January 21, 2016, State Prisons Turn to Telemedicine to Improve Health and Save Money

36 Michael Ollove, The Pew Charitable Trusts, January 21, 2016, State Prisons Turn to Telemedicine to Improve Health and Save Money

37 CTEL News, October 31, 2016, Telemedicine Behind Bars

VADOC's project for electronic health records (EHR) is already underway and will be an integral component of telemedicine because a doctor treating from anywhere will have up-to-the-minute health records on the offender and be able to provide immediate updates based on the evaluation. The EHR project has currently only been funded for implementation at female offender VADOC facilities. To realize this potential, funding is needed to implement the EHR system at all facilities. This funding must reflect increased staffing needs to support the application in the field.

The telemedicine units can cost around $10,000 each, but compared to medical staff salaries, transportation, and the inherent risk of offender movement outside of a facility, the benefits significantly offset the costs. VADOC needs funds to equip prisons to fully offer telemedicine services to the offender population. VADOC would also need to build out its telemedicine program to support using the equipment.

4.2.3 Automation of Common and Time-Consuming Human Resource Processes

Manual tasks that could be handled with a comprehensive Human Resources (HR) system consume a great deal of what could otherwise be productive staff time. These manual processes also make it easy to introduce data errors and are also very difficult to track for redundant submissions.

Using time entry and expense reimbursement as examples, employees without system access must fill out manual time logs or expense reports. These are then manually delivered for review. Any errors or questions require returning the paper log, corrections or replacement, and the cycle begins again. The result is that someone still must enter the information for time to be recognized for paychecks and expense reports entered for reimbursement. These entries must be verified and approved.

Conversely, with system in place to support time and expense entry, the entire paper exchange part of the process can be eliminated. Required time and expense codes are much easier to manage digitally as systems allow for search, selection, default and copy from previous versions. Paper-based processes require corresponding printed code lists. Using an example of saving just 15 minutes per employee per week with 11,000 VADOC employees, the weekly timesaving's would be:

$$11{,}000 * 15\,minutes = 165{,}000\,Minutes, or\ 2750\,hours$$

A single person working 40 hours a week for 52 weeks only logs 2080 hours. Carried out for an entire year, VADOC would gain 143,000 productive hours, or the equivalent of 68.75 full time employees. While these calculations are anecdotal and actual cost savings would vary, automating these manual and paper-based processes do have a real effect on productivity, employee morale, and data accuracy.

4.2.3.1 Supporting Technology – VADOC Enterprise HR System

VADOC needs an ERP system to automate human resource functions. With limited budgets, VADOC has focused spending on managing the business of corrections and have had to forgo spending on back office systems.

VADOC is implementing time tracking from Caliber. This implementation will help with some of the manual administrative tasks. VADOC needs to expand this effort to implement all the functions with Caliber that the Commonwealth has available. Other Commonwealth agencies have found the time savings from a comprehensive HR system have paid for installing the system. The biggest hurdle VADOC has is it does not have the up-front funding to implement the system to realize the savings and cannot divert funding without compromising safety.

Ideally, an HR system would be a Commonwealth-wide effort and remove the burden of managing HR systems from each agency. This consolidation would lead to savings within the agencies and in turn for the Commonwealth.

4.3 Technology and Programs for the Long Term (Ten to Twenty Years)

Ten to 20 years is a long time into the future, but it is important to note that VirginiaCORIS is now ten years old. The recommendations in this section, therefore, are realistic, long-term ideas to fully implement and enhance the programs already in place within the Virginia Department of Corrections. To realize these ideas will take a concerted effort from VADOC, along with multiple state and local agencies. Because ideas such as these – like VirginiaCORIS – often take many years to realize, VADOC should be alert for opportunities to move in the direction suggested by these concepts.

4.3.1 Single Source of Record for Commonwealth of Virginia Criminal Justice Information

The first interaction of an offender is never with the Virginia Department of Corrections. This first interaction is always with an arresting officer from a locality or the Virginia State Police. Currently, this initial interaction will lead to multiple entries in multiple agency applications, each with its own unique identifier and each requiring additional manpower and potentially additional errors introduced into the information as it is copied from system to system. Each system containing data on an offender presents the opportunity to have different addresses, aliases, photos, identifying marks, etc. Investigators, police, and probation officers all must access multiple systems to get a complete picture of an offender. This is tremendously time consuming and very unlikely to happen.

4.3.1.1 Supporting Technology – Unified Virginia Criminal Justice System (VCJS)

A unified Virginia Criminal Justice System would identify offenders uniquely from initial contact/ arrest/booking through holding, pre-trial, local incarceration, trial, sentencing, state corrections, and finally community corrections upon release. All agencies would use the same unique identifier and data source to all but remove the possibility of loss of accuracy or miss-identification.

Duplicate and inaccurate data cause problems for every business, and when dealing with arrests, trials, incarceration, and release, reliable and accurate data is a must. Incomplete or inaccurate records have contributed to releasing the wrong offender and have also caused problems for people who have not been incarcerated but get caught by a bad partial match on a background check[38]. The best way to help ensure that data is accurate and the same data is available to all that need it is to always have a single source of truth for data. In this case, this source would be a single data source for an offender from the moment they are identified until the moment they are completely released from the corrections system.

A system of this nature would still allow for each department or entity accessing or updating the offender data to have its own application with all the necessary modules to support its business needs. Instead of being retained locally, the data would instead be incorporated into the master database to provide a single unified view of each offender from arrest to release. Any agency updating base information like aliases or addresses would update the original source, which would in turn immediately be available for use by every other agency needing access to the offender data. This concept would

[38] The Atlantic, Alex Bender and Sarah Crowley, 5/25/2015, Haunted by the Past: A Criminal Record Shouldn't Ruin a Career

convert the current siloed systems for every agency and locality involved with public safety into an Enterprise Criminal Justice System for the Commonwealth.

4.3.2 Automation of Low Offender Contact Officer Duties

Every job comes with tasks or aspects that people do not want to do. There are also very repetitive or exacting tasks that while people can do them, mistakes are inevitable.

4.3.2.1 Supporting Program – Robotic Corrections Officers

Time has shown that for corrections, the night shifts are hard to keep staffed. While nights may be a time of least activity, officers are not on a schedule with their family and the need to be quiet, awake, attentive, and maintain vigil can make these positions harder to keep filled. While, studies show that interaction with human officers does provide positive human contact, these night shifts provide the smallest need for that human touch. Keeping this human contact frequent and positive is part of the recidivism programs for VADOC.

Robotics for use in corrections, however, might be able to help reduce the need for officer coverage at night by reducing the need for all nighttime officers to be human. South Korea has used robot corrections officers for both northern border control and workload relief in prisons[39]. Details have not yet been found for how effective this program has been, but – according to one article – robot corrections officers may be deployed at the 2018 Winter Olympics in Pyeongchang[40]. Use of robotic corrections officers would never replace the need for human corrections officers, but it could provide a supplement for physical rounds and issue detection at night and let the human corrections officers focus on the more involved day shifts and other facility security monitoring overnight.

Other applications for robotic involvement may come for medication delivery, food service, and inventory control and monitoring (contraband prevention through no human contact). So far, these ideas have not been tried, but they do offer the potential to decrease workloads and increase safety and even benefit offender health.

4.3.3 Automated Cargo and Inventory Management to Reduce Contraband

Any point during cargo delivery where there is the potential for human contact, there is the potential for contraband. The only way to eliminate the threat is to eliminate the human/cargo interaction.

4.3.3.1 Supporting Program – Robotic Inventory Management

Robots are already handling cargo. Amazon is a prime example of warehouse efficiency and a blending of human and robot inventory management[41].

To work in a prison warehouse environment, a robot would need more capabilities like the following:

1. Unload a delivery truck and properly organize and place items
2. Remove individual items from cases or containers

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39 Time Magazine, Nick Carbone, 11/27/2011, South Korea Rolls Out Robotic Prison Guards

40 Wired, April Glaser, 7/24/2016, 11 Police Robots Patrolling Around the World

41 QStock Marketing Team, A Day in the Life of an Amazon Robot

3. Recognize requested items and identify and "quarantine" any items not recognized
4. Pick up and carry items with unusual sizes and shapes
5. Handle and dispose of empty pallets
6. Dispose of packaging and other trash generated from shipping boxes
7. Deliver requested items to a secure drop-off space that can be locked at both entrances to prevent entry

There are many different robots available on the market with features and capabilities expanding. Recognition software and cameras are already able to distinguish faces, out of place items in cars, and other visual tasks. The evolution of robot technology will provide what corrections needs: Forklift or pallet jack robots for unloading and staging and sorting and picking robots for inventory management and secure delivery.

4.3.4 Automation of Offender Prescription Dispensing

Managing offender prescriptions can be a time-consuming process. Offenders must be moved to the prison medical offices where they wait until they are given the prescribed medicine and watched until it is taken. Offenders must then be returned to their cell blocks.

4.3.4.1 Supporting Program – Robotic "Nurses"

Nursing care in hospitals has benefited from technology that allows a medicine cart to be pre-loaded with individual prescriptions. As nurses move the carts room to room, they enter the appropriate patient and only the medicine for that patient is provided. This reduces chances for medical errors and reduces nurse contact with prescriptions that are not specific to the current patient.

An evolution of this available technology would be a combination of individual dispensing, offender location, and visual confirmation the prescriptions were taken.

These technologies do exist in some fashion separately. Offender location could be accomplished if RFID tracking bands are in place in a facility and an offender's location is available real-time. Facial recognition software is available and can confirm the person identified matches records. A dispensary system like those in use by nurses would be able to provide the proper prescription to the offender. Video monitoring capabilities would allow a remote nurse to verify the prescription was consumed.

4.3.5 Automated Offender Identification

When offenders move to community corrections and begin to reenter the lives they left, there is a likelihood that their appearance will change as they re-integrate into their jobs, family, and neighborhood. The first time a probation officer meets a new offender, the officer needs a way to accurately identify that individual.

4.3.5.1 Supporting Program – "Google Glass" Devices

A "Google Glass" type apparatus that can be coupled with VirginiaCORIS mobile and facial recognition software would provide a way to positively identify offenders during contact with probation officers. The camera could zoom in on the offender's face and use that image to compare to the last recorded image. Facial recognition software could confirm a match. The confirmation could then appear on the officer's mobile device or in the case of a real eyewear set, provide a heads-up display confirmation that

the offender's identity is confirmed. The recorded image for facial recognition could then be updated to the offender's CORIS records.

This technology would have to account for moments where offenders have a twin who is visually identical. A positive identity hit should include a warning of the potential false match and require other biometric verification if necessary.

5 Conclusion

The body of this report contains many recommendations for using technology to improve safety, productivity, and cost savings. In this section, these recommendations have been grouped by short, medium, and long-term timeframes for their adoption by the Virginia Department of Corrections. Since many of these initiatives depend upon technology that is already readily available, most recommendations are proposed for adoption during the next one-to-five years.

Additional criteria were applied to the recommendations that can be put to best effect for each range of time, as follows. After all the ideas were assembled and chronologically placed, a second set of ranking criteria were applied. The following four criteria were selected to weigh each idea:

1. Security Improvement
2. Productivity Improvement
3. Cost Savings
4. Importance to VADOC

Each recommendation was ranked on each criterion using a scale from 0 to 2, where 0 was low or no impact, 1 was moderate impact, and 2 was high impact. These scores were then accumulated for all criteria to push the highest impact ideas to the top. The highest-possible score is 8 and the lowest possible score is 0.

In the following subsections, recommendations are presented in the following order: 1) by timeframe, 2) importance to VADOC, and 3) listed by highest to lowest impact score from the ranking exercise. Using this as a guide, VADOC will be able to determine the ideas that promise the greatest improvements to its operations and outcomes.

In addition, a paramount consideration to keep in focus in reviewing these recommendations is that they all require additional funding and staff to implement and maintain. Both funding and IT staff are needed for any new system and program and operations staff are needed to operate, maintain, and even fix the installed systems. As noted in the 'Current Levels of Technology Support' section at the beginning of this report, by all standards VADOC's IT and Electronic Security teams are currently understaffed and only have a quarter the staff needed to support existing technology. VADOC is facing significant strategic risks in loss of services with staffing resources stretched this thinly across the organization.

5.1 Short-Term (One to Five Years)

A common theme amongst the top recommendations in this timeframe is improved security and monitoring. Three of the first four recommendations offer gains in safety, productivity by lessening the workload of officers, and in turn reducing both people and operating costs. Rounding out the top five are technology recommendations that enhance offender programs and using cloud computing.

The greatest value in the short-term is found within the top five recommendations. These provide gains across all three of the legislative criteria and align with VADOC's program and strategic direction.

Number	Business Need/Technology	VADOC Importance	Impact Score
1	Enhanced Perimeter Monitoring	2	7
	• Radar/CCTV Surveillance		
2	Offender Access to Technology	2	7
	• Tablets • Offender WIFI Network • Revenue Generation on Content Sales/Rentals		
3	Modern Facility Video Surveillance	2	7
	• High Definition CCTV Roll-out • Comprehensive Video Storage Expansion		
4	Comprehensive Offender Tracking and Monitoring	2	7
	• Facility-wide Active RFID		
5	Increased System Availability, Scalability, Redundancy, Accessibility	2	7
	• Cloud-Based Computing		
6	Enhanced Contraband Detection	2	6
	• Person Screening • Shakedown Screening		
7	Improve Offender Probation Visit Processing	2	6
	• Automated Check-in Kiosks in Waiting Rooms		
8	Offender Classification-Based Probation and Parole Model	2	6
	• Expanded GPS Offender Monitoring • Mobile Officer Devices		
9	Comprehensive Information to Support Evidence Based Practices	2	5
	• Business Intelligence based on Data Governance and Data Warehouse		
10	Lower System Outage Rate at Remote Sites	2	5
	• Redundant ISPs • Increased Bandwidth at Prison Facilities • Remove Network Bottlenecks		
11	Increase Capital Budgets Through Revenue Generating Opportunities	2	4
	• License VADOC Developed Technology		

Number	Business Need/Technology	VADOC Importance	Impact Score
12	Cell Phone Use/Misuse Prevention	2	4
	• Managed Access Services (MAS) • Better Contraband Detection		
13	Support for Mandated but Non-Policy Technology	2	4
	• Revision of VITA Policies		
14	Comprehensive National Criminal Information Access	2	3
	• FBI N-DEx System		
15	Enhanced Officer Training	1	6
	• Virtual Classrooms • Probation Officer Technology Exploitation Training		
16	Inventory Control	1	5
	• Bar Coding • Passive RFID • Managing Assets in the Cloud		
17	Insight into Community Corrections Offenders Between Visits	1	4
	• Social Media Monitoring		
18	Improved Offender Transportation Safety	1	4
	• Real-time Vehicle Tracking and Fleet Management • Real-time Vehicle Cabin Video • Offender Tracking • Improved Offender Transportation Logistics		
19	Increased Officer Safety and Productivity	1	4
	• Body Cameras • Mobile Devices • Corrections Facility WIFI		
20	Single-Source for All Offender Information	1	4
	• Additional Modules in VirginiaCORIS		
21	Enhanced Tele-visitation	1	4
	• Offender Devices and Service Scheduling		

22	Reduced Travel Expenses	0	4
	• Telepresence/Video Conferencing		

Exhibit 3 – Short-Term Technology Initiatives Ranked by Importance and Impact

5.2 Medium-Term (Five to Ten Years)

For the medium-term period, changes to the probation program are the highest value recommendation and promise the highest impact. This is because the changes reduce probation officer workload, increase surveillance of high-risk offenders, and significantly reduce real estate leasing costs.

Three of the remaining four recommendations are extensions of recommendations from the short-term period. These technologies would really need to be addressed after the initial recommendations were underway or already completed.

Telemedicine is highly-ranked as it reduces offender transportation, which reduces costs, improves safety as transportation times are higher risk, and increases officer productivity as much less time is needed to move offenders offsite. With Texas spending roughly half the amount that other states require - without reducing the quality of care - this technology shows great promise.

Number	Business Need/Technology	VADOC Importance	Impact Score
1	Enhanced Perimeter Monitoring	2	7
	• Drone Surveillance • Drone Disablement		
2	Offender Access to Technology	2	7
	• Plug and Play Content Providers		
3	More Cost-Effective and Better-Quality Healthcare	2	7
	• Telemedicine		
4	Enhanced Contraband Detection	2	6
	• Vehicle and Cargo Screening		
5	Better Data Sharing Across Commonwealth and Federal Agencies	2	6
	• Interface Standardization • Department System Upgrades • System Replacement		
6	Automation of Common and Time-Consuming Human Resource Processes	2	5
	• VADOC Enterprise HR System		

Exhibit 4 – Medium-Term Technology Initiatives Ranked by Importance and Impact

5.3 Long-Term (Ten to Twenty Years)

For the long-term period, VADOC's priority is directed towards technology to improve the workloads of staff. The concept of a single criminal justice system would greatly benefit the Commonwealth, but is not high on VADOC's list because most of the work would be performed outside of the department.

The remaining items are within the realm of possibility, but will require significant reductions in costs and convergence of multiple existing technologies to realize.

Number	Business Need/Technology	VADOC Importance	Impact
1	Automated Offender Identification	2	4
	• "Google Glass" Devices		
2	Single Source of Record for Commonwealth of Virginia Criminal Justice Information	1	7
	• Unified Virginia Criminal Justice System (VCJS)		
3	Automated Cargo and Inventory Management to Reduce Contraband	1	5
	• Robotic Inventory Management		
4	Automation of Low Offender Contact Officer Duties	1	4
	• Robotic Corrections Officers		
5	Automation of Offender Prescription Dispensing	1	2
	• Robotic "Nurses"		

Exhibit 5 – Long-Term Technology Initiatives Ranked by Importance and Impact

6 Appendix A – Recommendation Rankings

Business Need	Timeframe	Technology	Security	Productivity	Cost	Importance	Impact
Enhanced Perimeter Monitoring	Short-Term	• Radar/CCTV Surveillance	2	1	2	2	7
Offender Access to Technology	Short-Term	• Tablets • Offender WIFI Network • Revenue Generation on Content Sales/Rentals	2	1	2	2	7
Modern Facility Video Surveillance	Short-Term	• High Definition CCTV Roll-out • Comprehensive Video Storage Expansion	2	2	1	2	7
Comprehensive Offender Tracking and Monitoring	Short-Term	• Facility-wide Active RFID	2	2	1	2	7
Increased System Availability, Scalability, Redundancy, Accessibility	Short-Term	• Cloud-Based Computing	2	2	1	2	7
Enhanced Contraband Detection	Short-Term	• Person Screening • Shakedown Screening	2	1	1	2	6
Improve Offender Probation Visit Processing	Short-Term	• Automated Check-in Kiosks in Waiting Rooms	0	2	2	2	6
Enhanced Officer Training	Short-Term	• Virtual Classrooms • Probation Officer Technology Exploitation Training	2	2	1	1	6
Offender Classification-Based Probation and Parole Model	Short-Term	• Expanded GPS Offender Monitoring • Mobile Officer Devices	2	1	0	2	5

Business Need	Timeframe	Technology	Security	Productivity	Cost	Importance	Impact
Lower System Outage Rate at Remote Sites	Short-Term	• Redundant ISPs • Increased Bandwidth at All Prison Facilities • Remove Network Bottlenecks	1	1	1	2	5
Comprehensive Information to Support Evidence Based Practices	Short-Term	• Business Intelligence based on Data Governance and Data Warehouse	0	2	1	2	5
Inventory control	Short-Term	• Bar Coding • Passive RFID • Managing Assets in the Cloud	0	2	2	1	5
Increase Capital Budgets Through Revenue Generating Opportunities	Short-Term	• License VADOC Developed Technology	0	0	2	2	4
Cell Phone Use/Misuse Prevention	Short-Term	• Managed Access Services (MAS) • Better Contraband Detection	1	1	0	2	4
Support for Mandated but Non-Policy Technology	Short-Term	• Evolution of VITA from Restrictive and Controlling to Governing and Enabling	1	1	0	2	4
Insight into Community Corrections Offenders Between Visits	Short-Term	• Social Media Monitoring	2	0	1	1	4
Improved Offender Transportation Safety	Short-Term	• Real-time Vehicle Tracking and Fleet Management • Real-time Vehicle Cabin Video • Offender Tracking • Improved Offender	1	1	1	1	4

Business Need	Timeframe	Technology	Security	Productivity	Cost	Importance	Impact
		Transportation Logistics					
Increased Officer Safety and Productivity	Short-Term	• Body Cameras • Mobile Devices • Corrections Facility WIFI	1	2	0	1	4
Single-Source for All Offender Information	Short-Term	• Additional Modules in VirginiaCORIS	0	2	1	1	4
Enhanced Tele-visitation	Short-Term	• Offender Devices and Service Scheduling	1	1	1	1	4
Reduced Travel Expenses	Short-Term	• Telepresence/Video Conferencing	0	2	2	0	4
Comprehensive National Criminal Information Access	Short-Term	• FBI N-DEx System	0	1	0	2	3
Enhanced Perimeter Monitoring	Medium-Term	• Drone Surveillance • Drone Disablement	2	1	2	2	7
Offender Access to Technology	Medium-Term	• Plug and Play Content Providers	2	1	2	2	7
More Cost-Effective and Better-Quality Healthcare	Medium-Term	• Telemedicine	2	1	2	2	7
Better Data Sharing Across Commonwealth and Federal Agencies	Medium-Term	• Interface Standardization • Department System Upgrades • System Replacement	1	2	1	2	6
Enhanced Contraband Detection	Medium-Term	• Vehicle and Cargo Screening	2	1	1	2	6
Automation of Common and Time-Consuming Human Resource Processes	Medium-Term	• VADOC Enterprise HR System	0	1	2	2	5

Business Need	Timeframe	Technology	Security	Productivity	Cost	Importance	Impact
Single Source of Record for Commonwealth of Virginia Criminal Justice Information	Long-Term	• Unified Virginia Criminal Justice System (VCJS)	2	2	2	1	7
Automated Cargo and Inventory Management to Reduce Contraband	Long-Term	• Robotic Inventory Management	2	2	0	1	5
Automated Offender Identification	Long-Term	• "Google Glass" Devices	1	1	0	2	4
Automation of Low Offender Contact Officer Duties	Long-Term	• Robotic Corrections Officers	2	1	0	1	4
Automation of Offender Prescription Dispensing	Long-Term	• Robotic "Nurses"	0	1	0	1	2