

**Maryland General Assembly  
Joint Committee on Cybersecurity, Information Technology,  
and Biotechnology**

**2015 Interim  
Membership Roster**

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THE MARYLAND GENERAL ASSEMBLY  
ANNAPOLIS, MARYLAND 21401-1991

JOINT COMMITTEE ON CYBERSECURITY, INFORMATION TECHNOLOGY, AND BIOTECHNOLOGY

December 17, 2015

The Honorable Thomas V. Mike Miller, Jr., Co-chairman  
The Honorable Michael E. Busch, Co-chairman  
Members of the Legislative Policy Committee

Ladies and Gentlemen:

The Joint Committee on Cybersecurity, Information Technology, and Biotechnology respectfully submits this summary report of its 2015 interim activities. As you know, the joint committee's statutory charge is to "work to broaden the support, knowledge, and awareness of advances in cybersecurity, information technology, and biotechnology to benefit the people of Maryland, evaluate State cybersecurity systems and the adequacy of economic development and job skills training programs to advance cybersecurity in the State, and make recommendations regarding actions to promote cybersecurity, information technology, and biotechnology industries in the State." The committee met twice during the interim: August 26 and October 19, 2015. At the first meeting, the joint committee was briefed on the status of the production and use of energy storage technology in Maryland and on the use of big data to assist government in providing public services (*i.e.*, in law, education, human services, and transportation). The second meeting was a site visit to the U.S. Army Alliance headquarters at Aberdeen Proving Ground.

On behalf of the committee, we wish to thank those individuals who contributed their time and effort during the 2015 interim in assisting the committee with its work.

Respectfully submitted,

James C. Rosapepe  
Senate Chairman

C. William Frick  
House Chairman

JCR:CWF/TDB/tas

cc: Mr. Warren G. Deschenaux  
Ms. Lynne B. Porter

# **Joint Information Technology and Biotechnology Committee 2015 Interim Report**

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## **Update from the Department of Information Technology (DoIT)**

On August 26, 2015, the committee heard from the Honorable David A. Garcia, Secretary, DoIT. According to Secretary Garcia, cybersecurity is the most critical issue facing the State's IT systems. The current infrastructure of multiple operating systems, running on dozens of hardware platforms, hosting hundreds of software configurations offers numerous challenges. DoIT's solution to these challenges is to introduce a common platform that can be managed effectively, known as the Enterprise model. Outdated, unsupported operating systems will be updated to current, secure versions that will run on a limited number of hardware platforms. Software such as Office, Adobe, and antivirus will be centrally configured, security patched, tested, and deployed as platforms that support the end-user's mission. The hiring of a Fortune 500 caliber Chief Information Security Officer will drive a common vision that will secure against today's risks and assess future hazards. Standards and policies will become self-enforcing as individual departments are integrated with DoIT's security systems. Security training will be developed by cyber professionals and targeted towards current threats using consistent messaging. This plan is ambitious, and it will take time to ensure that all steps are taken to meet the appropriate security standards that are expected from a top-notch technology organization. DoIT needs to provide not only a cost-conscious solution but a solution that provides appropriate security before Maryland is the one in the next data breach spotlight.

## **Briefing on the Status of the Production and Use of Energy Storage Technology in Maryland**

Also on August 26, the committee heard from Will Nicholas, Government Relations Manager, Tesla Motors; Mr. Pete Fuller, Vice President of Marketing and Regulatory Affairs, NRG and Scott Baker, Senior Business Solution Analyst, PJM Interconnection. Their remarks are summarized below.

Founded in 2003, Tesla's mission is to accelerate the world's transition to sustainable energy. According to Mr. Nicholas, Tesla introduced its energy proposal in 2015. The company anticipates that it will build a gigafactory (50 GWh) by 2020 for annual battery production. The factory will produce enough to power 500,000 Tesla cars using renewable energy (called a net zero energy factory). Tesla's products include Model S vehicles (70 kWh, 85 kWh, and 90kWh), power wall home batteries (7 kWh and 10 kWh), and power pack commercial batteries (100 kWh+). Tesla anticipates a distributed system to include 70,000 vehicles, in 31 countries, over 1 billion miles, 5+ GWh storage, and 21 GW bi-directional three-phase AC inverters. The power wall is a rechargeable lithium-ion battery designed to store energy at a residential level for load shifting, backup power, and self-consumption of solar power generation. The unit mounts on

a wall and is integrated with the local grid to harness excess power and give customers the flexibility to draw energy from their own reserve. The power pack commercial batteries are used for energy storage that are designed for businesses to maximize consumption of on-site clean power, avoid peak demand charges, buy electricity when it is cheapest, get paid by utility or intermediate service providers for participating in grid services, and back up critical business operations in the event of a power outage. Current energy business and utility projects include Target, Jackson Family Wines, EnerNoc, Utility Projects, OnCor, Southern California Edison, AES, and Advanced Microgrid Solutions.

According to Mr. Fuller, NRG is the nation's largest independent power producer and the second largest generator of electricity overall. NRG is leading a customer-driven change in the United States energy industry by delivering cleaner and smarter energy choices, while building on the strength of the nation's largest and most diverse competitive power portfolio. NRG, a fortune 250 company, creates value through reliable and efficient conventional generation while driving innovation in solar and renewable power, electric vehicle ecosystems, carbon capture technology and customer-centric energy solutions. The company's retail electricity providers serve almost 3 million residential and commercial customers throughout the country. NRG owns and operates four generating plants in Maryland. In 2014, NRG set a course towards a clean energy future, setting ambitious sustainability goals as part of its continued corporate growth strategy. The core of its goals is to reduce the company's carbon dioxide emissions and to leverage and grow core generation capabilities in a sustainable, lower carbon manner. NRG is expanding and extending its eVgo network, which gives electric vehicle owners new freedom and range confidence via home and workplace charging. NRG is identifying opportunities to develop Microgrids and continues to develop solar power on a large scale, including residential installations and leasing. The benefits of battery storage are evident, as customers want to reduce demand charges, have more grid usage during low price periods, have resilient and reliable ancillary services, and lower high peak usage.

PJM Interconnection is the regional transmission organization and grid operator for Maryland, the District of Columbia, and 12 other states in the mid-Atlantic and Midwest regions. Within this footprint, PJM is responsible for the reliability of the bulk electric system. According to Mr. Baker, PJM achieves reliable grid operations through the coordination of competitive wholesale electricity markets and a regional transmission planning process. The wholesale electricity markets in PJM have played a vital role in the development of the nascent energy storage industry. The PJM market represents the largest source of energy storage development in the United States with 136 MW currently in service and approximately 587 MW under construction or awaiting study for interconnection, including an 11 MW battery project in western Maryland. The primary service that energy storage provides to PJM is called regulation. Regulation is a reliability service in which resources (traditional generators, energy storage devices, or loads) are dispatched on a second by second basis to either increase or decrease their output. This continual adjustment of regulation resources is needed to maintain the balance between load and generation. PJM competitively procures this service through its Regulation Market, which selects the least cost pool of resources to provide the service. The reason that energy storage devices have thrived in the Regulation Market is because of a market design change that was made in 2012 which places



a monetary value on the actual performance of a resource that is following the regulation dispatch signal. Energy storage resources are highly controllable devices that can follow a regulation dispatch signal very accurately. Energy storage is a dynamic new technology for the electric power industry – but it is in a formative stage of development. Competitive wholesale markets provide a platform for energy storage to deliver services that maintain the reliability of the bulk electric system, but access to additional value streams, particularly within utility territories at the distribution level, will also be very important to unlocking the full potential of this technology.

The committee asked the presenters how the legislature can help with the challenges in developing this new technology. As the new technology develops, the cost will become more economical and the design will improve. Any kind of policy initiative with the legislature or Public Service Commission (PSC) to encourage early stage incentives of framework development would be helpful to allow investors to see the value and uses of battery storage.

## **Briefing on the Use of Big Data to Assist Government in Providing Public Services**

Additionally, on August 25, the committee held a briefing that focused on the use of big data in law, education, human services, and transportation.

### **In Law**

Addressing the issue of using big data in law, the Honorable Brian E. Frosh, Attorney General of Maryland, highlighted an August 10, 2015 article in The New York Times “Judges Replacing Conjecture With Formula for Bail” that discusses a modern form of foretelling whether a defendant is likely to commit another crime, hurt someone, or skip out on the next court date. The Laura and John Arnold Foundation’s algorithm (Public Safety Assessment) helps judges with their task of setting bail. The algorithm gives defendants two scores – one for their likelihood of committing a crime and one for their risk of failing to appear in court and flags those with an elevated risk of violence. The assessment uses factors that are the best predictors of a defendant’s behavior: age, criminal record, and previous failures to appear in court, along with more recent offenses. It does not consider characteristics that judges and prosecutors normally consider relevant (*i.e.*, defendant’s employment status, community ties, or history of drug and alcohol abuse).

Attorney General Frosh also spoke about the use of big data in the pretrial detention process. About 12 million people are booked each year with 60% of them held in jail waiting to be tried. The cost to house them in jail is \$9 million to \$17 million per year. Judges can do a better job by applying the Arnold Foundation’s assessment as an additional analysis tool when determining bail. There are a small number of factors (nine) that predict behavior.

The Honorable Christopher Shank, Executive Director, Governor's Office of Crime Control and Prevention, discussed the use of big data analysis technologies to improve public safety. With the increase in data, there is an increase in probability as relationships are identified within these data sets. Mr. Shank described the approach his office uses – identify a problem (*i.e.*, heroin is killing people and prisons and jails are overcrowded with drug offenders and addicts); formulate an approach using many facets (*i.e.*, political, legislative, social change, sentencing reform, public-private partnerships, and technology), develop research questions (*i.e.*, how can data and technology be used to create a risk assessment tool in order to identify individuals who are most likely to overdose, while developing a strategy utilizing treatment versus incarceration), and collect and analyze big data sets (from a number of sources: identify trends and relationships, and develop risk assessment tools and predictive models).

The committee asked the presenters about racial factors and inconsistent data collection around the State. The Public Safety Assessment is a tool that assists judges when they make bail decisions; but, judges make the ultimate decisions based on factors the judge determines. There are no discriminatory factors that are part of the Public Safety Assessment (*i.e.*, race and ethnicity) used in the assessment. The various law enforcement and corrections systems need to be modernized so that data collection is consistent and shared in useful ways.

### **In Education**

To learn more about the use of big data in education, the committee heard from Peter C. Young, Senior Vice President, Office of Analytics, Planning and Technology, University of Maryland University College (UMUC); and Jack Neill, Senior Director, Data Analysis, Office of Analytics, UMUC. By integrating data from a variety of existing and new sources, educational institutions can receive deeper insight into organizational performance, evaluate student risk factors, and deliver more personalized learning experiences. University of Maryland University College has invested in big data and advanced analytics to drive change and impact outcomes. This change in the culture relies on data to guide decision making and actions throughout the organization. Institutional analytics – to support operational and financial decision making – include enrollment management analytics, key performance dashboards, financial forecasting, and application scoring. Learning analytics – to support the achievement of specific learning goals – include student risk and persistence scoring, classroom engagement metrics and alerts, adaptive learning technologies, and retention analysis. As a result of the use of big data, there are success stories. New student enrollment in the fall of 2014 increased by 20%, while recruitment expenses were reduced by 20% due to better targeting and smart spending. Pilot programs using predictive analytics to improve successful course completion have shown positive results in accurately predicting which students are at risk; these pilot programs saw an increase in course completion rates by three percentage points. Collecting and organizing the right data allows the university to quickly respond to the strategic questions and priorities of the university.

The committee asked how big data can be used to determine whether a course design or instruction by a professor should be changed and how the legislature can help with any barriers.

The university, for example, uses big data to determine who is not likely to complete a course; perhaps some are at risk because they did not take a prior course that was needed to prepare them). The university can use this information to require “pre-requisite” courses. The university appreciates any support for innovation and learning opportunities.

### **In Human Services**

Tom Fusting, Chief Technology Officer, Department of Human Resources (DHR) and John Evans, Deputy Chief Technology Officer, DHR, spoke about the challenges that DHR has in delivering improved outcomes. DHR systems are antiquated and difficult to change. There is redundant inefficient data entry. There is cumbersome data analytics and no data visualization. They need a modernized system to improve efficiency, reduce operational costs, respond to new requirements, have reliable data and relevant search, prioritize workloads, and measure program effectiveness for improve outcomes.

The committee agreed that DHR has a vision but needs funding for computer upgrades in order for it to have the opportunities that can be achieved with big data.

### **In Transportation**

Nik Ivanov, Deputy Director, Center for Advanced Transp. Technology Laboratory and Subrat Mahapatra, Transportation Manager, Office of Planning/Preliminary Engineering, State Highway Administration, Department of Transportation provided information on the use of big data in transportation services. There is a lot of data that the Center For Advanced Transportation Technology (CATT) Laboratory can analyze for the Department of Transportation. Each day, there are about 40,000 traffic event records, 35 million traffic detector records, and 4.2 billion probe vehicle records. CATT uses the Regional Integrated Transportation Information System (RITIS) which receives data on various areas of the transportation network, including traffic, events, parking, weather, signals, and transit. RITIS is an automated data fusion and dissemination system that provides an enhanced, comprehensive view of the transportation network. Participating agencies are able to view essential transportation information through innovative visualizations and use it to substantially improve their project planning, traffic operations, and emergency preparedness. There are GPS Probe vehicle applications, including determining the worst bottlenecks in the region and congestion patterns. Data can be used for winter weather and major event coordination and work zone performance monitoring.

The committee mentioned that there are still bottlenecks. CATT provides strategies to mitigate these (*i.e.*, geometric improvements or altering traffic lights), but big data is still evolving and some solutions may shift the problem elsewhere. There are opportunities with the data but still challenges in collecting some data (*i.e.*, nonsharing of data among agencies) and putting a value on the data in order to come up with solutions.

## **Tour of the U.S. Army Alliance headquarters at Aberdeen Proving Ground (APG) – October 19, 2015**

The committee received welcoming remarks from Major General Bruce T. Crawford, APG Senior Commander, Commanding General (CG), Communications-Electronics Command (CECOM). Throughout the tour, among others, the committee was briefed by Mr. Henry Muller, Director, Communications-Electronics Research, Development and Engineering Center (CERDEC); Mr. Mike Crapanzano, Associate Director, Software Engineering Center (SEC), Intelligence, Electronic Warfare and Sensors (IEW&S), CECOM; Mr. Matt Lazzaro, CERDEC; Mr. Scott Newman, CERDEC; and Mr. Rob Carter, Army Research Laboratory (ARL) Product Development.

At APG, there are five centers (Research and Development; Command, Control, Communications, Computers, Intelligence, Surveillance, Reconnaissance (C4ISR); Public Health Sciences; Test and Evaluation; and Chemical, Biological, Radiological, Nuclear, High Yield Explosives (CBRNE). APG has the third largest workforce in Maryland, with over 21,000 military and Department of Army civilians and contractors. APG brings \$1.8 billion in economic activity to Maryland and \$2.3 billion to small businesses. The site's infrastructure includes 57 test facilities, 13 surety labs, and 2,410 buildings. The Department of Defense cyber strategy includes the goal of building and maintaining ready forces and capabilities to conduct cyberspace operations. Operations include building, operating, and defending the network; attacking and exploiting enemy and adversary systems; gaining situational understanding; and protecting individual platforms. The APG community is executing a coordinated approach to the development, procurement, testing, delivery, and sustainment of cyber capabilities. APG's cyber strategic partners include the private sector (28 Cooperative Research and Development Agreements (CRADA), the acquisition and user community (*i.e.*, systems engineering, cyber operations, and architecture), nonarmy (cyber operations and technical forensics), and international (current agreements with Australia, Canada, and United Kingdom).

The committee toured several APG facilities, including:

- the Army Rapid Reprogramming (ARAT) and Cyber Electro-Magnetic Activity (CEMA) Lab which develops, delivers, and sustains software for electronic warfare systems and other electromagnetic spectrum capabilities to support commanders across the full range of military operations;
- the C4IRS Systems Integration LAB (CSIL) which provides a simulated, advanced lab environment for engineers to assess, evaluate, and integrate new capabilities onto current and next generation tactical networks; aims to ensure new technologies work not only as individual capabilities but also that they work in a tactical environment and are interoperable with the existing network; and provides a powerful resource to identify and resolve bugs and ensure configuration settings and mission threads are validated prior to the field evaluation;



- the Cyber Security and Information Assurance (CSIA) Lab which conducts research and development to prevent, resist, detect, respond to, or recover from actions that compromise or threaten to compromise the availability, integrity, or confidentiality of computer- and network-based systems; and
- the Edgewood Chemical Biological Center (CBC) Engineering Directorate Advanced Design and Manufacturing (ADM's) Rapid Technologies Laboratory (RTL) which is a state-of-the art facility equipped with a wide selectin of high end additive manufacturing and 3D data capture capabilities.

The committee may be interested in considering legislation or other initiatives to promote cooperation with APG on homeland security/first responder capacity in Maryland. Further, perhaps there are ways APG could assist the State with information technology and cybersecurity issues.