

**PLAN FOR MAKING MARYLAND THE NATIONAL LEADER IN
HOMELAND SECURITY PREPAREDNESS BY 2012**

**Governor's Office of Homeland Security
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Executive Summary

Homeland security and preparedness is the responsibility of every level of government and without a strong strategic vision, coordinated progress is impossible. Given Maryland's dense population and proximity to the national capital region, it is especially critical that the State possess nation-leading homeland security preparedness infrastructure and response capability to protect citizens from various natural and man-made threats and hazards. Towards that end, in 2009 the O'Malley-Brown Administration introduced the following twelve (12) basic, core capacities which the State and first responders in every Maryland region should have in order for Maryland to have truly comprehensive homeland security preparedness:

1. **Interoperable Communications**—First responders in every region in Maryland should have access to a fully digital, trunked radio system which all response partners can access in order to transmit and receive voice and data. First responders in every region should have robust CAD/RMS systems capable of coordinating dispatch data for all response partners and capable of transmitting data to systems such as WebEOC for consolidation and roll up of regional CAD data
2. **Intelligence/Information Sharing**—Law enforcement officers in every region in Maryland should have the ability to transmit and receive law enforcement database information from the field and share that information on a real-time basis. Maryland's fusion center should share useful and actionable information from the field and from regional and federal counterparts with every jurisdiction on a real time basis.
3. **HAZ MAT/Explosive device response**—Every metropolitan region should have a Type 1 Haz Mat team and a Type 1 bomb response team, either as one unit, or separate units, and there should be sufficient units statewide to provide a mutual aid response in any jurisdiction within a minimal amount of time. These teams should all be trained for both fire and law enforcement response.
4. **Personal Protective Equipment for First Responders**—All police officers, firefighters, and emergency medical providers in every metropolitan region should have ready and immediate access to personal protective equipment, including at a minimum some form of emergency airway protection, access to more advanced breathing apparatus and protective suits, and medications and antidotes against common WMD agents, and the training to use this equipment properly. All police officers, firefighters, and emergency medical providers in rural regions should have ready and immediate access to personal protective equipment appropriate to local hazards.
5. **Biosurveillance**—Every region in Maryland should have access to a real-time, 24/7 statewide biosurveillance system that incorporates a wide span of data, including symptoms presenting in emergency rooms and to paramedics, over-the-counter sales of pharmaceuticals, animal carcass pick up, and in metropolitan areas, sensor-based data, such as air monitoring for chemical and radiological releases.
6. **Vulnerability Assessment**— Every region in Maryland should have a comprehensive all-hazards threat and vulnerability assessment in place and fully updated every three years, including an assessment and inventory of critical infrastructure in the region. Maryland should have a complete inventory of critical infrastructure, including assets controlled by the private sector, and other potential targets, such as communities and populations of interest. This inventory should include a regularly updated assessment of specific vulnerabilities that identifies any major gaps where funds should be invested to harden the most vulnerable and at-risk targets.
7. **Training and Exercises**— Every region in Maryland should have a fully funded program of annual training and preparedness exercises which address the most likely hazards and threats for that area, including drills with partner

jurisdictions who may provide mutual aid at least twice per year. The training and exercise program should include refresher training on specialized and personal protective equipment and exercise in core competency areas such as the use of interoperable communications equipment.

8. **CCTV**— Maryland should have a robust closed circuit television (CCTV) network to secure critical infrastructure such as power and water treatment plants and to provide the ability to monitor events in real time via means such as highway cameras to aid in evacuation control, and patrol car, helicopter, and marine unit downlinks to aid in incident response. Images should transmit to IP in order to be portable to and from key local and state facilities, such as emergency operations centers and mobile command posts.
9. **Mass Casualty/Hospital Surge**— Every region in Maryland should have the equipment, supplies, and training to respond to a mass casualty event either directly or via close at hand mutual aid, including events requiring mass decontamination. Maryland should have pre-identified surge plans from areas hospitals that identify likely gaps in hospital resources, a statewide information sharing systems between hospitals (both electronic, and MOU-type agreements), supply stockpiles, and emergency plans for alternate treatment, such as temporary field hospitals.
10. **Planning**— Every region in Maryland should have the capacity to develop plans to conduct no-notice and advance notice evacuation of its population, including special needs populations, persons without transportation, and vulnerable facilities such as hospitals, nursing homes, and assisted living centers—and in conjunction with partners, access to the equipment, personnel and supplies to carry out these plans. Every region should have plans and the capacity to set up mass shelters, including accommodations for special needs populations and pets. Plans should be shared and coordinated regionally and exercised annually at least at the tabletop level.
11. **Backup Power and Communications**— Every region in Maryland should have an inventory of preidentified critical facilities, including privately owned facilities such as gas stations, and an up to date assessment of their backup power capabilities. The most critical facilities should receive permanent backup generators or be prewired for power from mobile units, and a stockpile of publicly owned or inventory of privately-owned generators should be maintained. Every region should have a backup 911 system, whether it is an alternate facility or the means to roll calls over to a neighboring jurisdiction.
12. **Transportation Security**— Maryland’s water ports, airports, train stations, subways, and rail lines should be fully hardened against attack with permanent physical countermeasures such as CCTV, lighting and fencing, and receive regular and randomly assigned heightened attention from covert and overt patrols by local and state law enforcement. Local and mutual aid first responders should be issued specialized equipment needed to operate in these unique environments, such as radios capable of operating underground and extended life breathing apparatus, and participate in annual on-scene exercises involving likely threat scenarios.

These Core Capacities are specific, concrete and measureable, and their achievement will position Maryland as the Nation’s preparedness leader, with robust capabilities to respond to the various categories of homeland security threat. Maryland’s comprehensive planning efforts around the many elements that comprise homeland security and the subsequent implementation of the 12 Core Capacities—outlined in the following strategic plan—are intended to serve as a national model for homeland security preparedness at the State level.

Background

As demonstrated by the attacks of September 11, 2001 and natural disasters such as Hurricane Katrina, lives can be lost—or saved—on the basis of core systems and capabilities such as communications and power generation and their ability to function under the most extreme duress. The tools used by public safety on a daily basis should be—and are—the same

tools needed for homeland security. For example, the information and intelligence systems used to combat drug trafficking and money laundering are the same systems needed to detect and prevent acts by international terrorists. Accordingly, Maryland's Homeland Security strategy is built on a series of core systems and capabilities that are fundamental to public safety during both daily operations and elevated incidents. These "Core Capacities for Homeland Security Preparedness" reflect comprehensive analysis by the State and local partners to identify opportunities for improved coordination and information sharing among agencies and groups; gaps in the State's ability to respond to certain forms of threat, and technological infrastructure advancements necessary to modernize and improve the efficiency of our preparedness efforts. The Governor's Office of Homeland Security has organized multi-agency coordinating groups to meet regularly to drive progress related to key projects under each Core Capacity, and to identify areas for further improvement. This "Joint Executive Council" and its Sub-groups comprise representatives from the Maryland Emergency Management Agency, State Police, Department of Transportation, Department of Health and Mental Hygiene, Department of Public Safety and Correctional Services, Department of Information Technology, and several regional and local partners.

To further unify the State's vision for a safe and prepared Maryland, and to build on the work already underway to create a comprehensive approach toward homeland security, the O'Malley-Brown Administration has created the strategic goal to Make Maryland the National Leader in Homeland Security Preparedness by 2012. The achievement of this goal will require significant progress across all 12 Core Capacities, as articulated in the following sections of this plan, as well as endorsement from the federal government of Maryland's efforts as a national model for homeland security preparedness.

Achieving the levels of capability described in Governor O'Malley's 12 Core Capacities will bring Maryland to a high level of preparedness across the key disciplines involved in homeland security: law enforcement, fire service, specialty response, emergency management, emergency medicine, public health, and planning. Not only will the achievement of the goals described in the 12 Core Capacities increase Maryland's capabilities in specific discipline areas it will also represent a leap forward in the technologies used for homeland security in our state. Maryland is already a leader in homeland security, but, in achieving these goals, Maryland will strengthen its position of leadership in this area.

Consistent with Governor O'Malley's common sense ground-up approach to homeland security, building the capabilities required during emergencies across disciplines, Maryland will have made significant progress in securing the life, livelihood, and property of our citizens by completing the strategies detailed below.

Strategic Approach: *Achieving the 12 Core Capacities for Homeland Security Preparedness*

Strategy 1 – Achieving Interoperable Communications for Law Enforcement and First Responders

Agency Lead(s): Maryland State Police and Department of Information Technology

Background: Interoperable communications refers to the ability for first responders to transmit voice and data communications seamlessly and in real-time, when needed, regardless of agency or jurisdictional boundary. When communications systems are interoperable, police and firefighters responding to a routine incident or a catastrophic emergency can talk to and share information with each other to coordinate efforts and work effectively together under a common operating picture. Interoperability should address not simply voice communications but also sharing data across systems such as Closed Circuit Television (CCTV), Computer Aided Dispatch and Record Management Software (CAD/RMS), or Geographic Information Systems (GIS).

Under Governor O'Malley the State has formalized leadership structures and consolidated disparate initiatives and resources into unified efforts to build a statewide radio system, computer-aided dispatch/records management system (CAD/RMS), and geographic information system (GIS) platform. These backbone systems will replace non-interoperable, obsolete or non-existent technologies currently being used by State public safety agencies and will provide a statewide infrastructure for local governments.

Sub-Goal: First responders in every region in Maryland should have access to a fully digital, trunked radio system which all response partners can access in order to transmit and receive voice and data. First responders in every region should have robust CAD/RMS systems capable of coordinating dispatch data for all response partners and capable of transmitting data to systems such as web-based emergency operations centers (WebEOC) for consolidation and roll up of regional CAD data.

Implementation Actions/Targets: Ensuring that Maryland's interoperability goals are met will require the following key components:

- *First responders in every region in Maryland should have access to a fully digital, trunked radio system which all response partners can access in order to transmit and receive voice and data.* Ensuring that first responders in every region have access to fully digital, trunked radio systems will require the development of a statewide interoperable radio communications plan and system in partnership with all state agencies and local jurisdictions, interim/gap solutions in order to sustain operability and interoperability as the State migrates to a fully interoperable communications system as well as the deployment of handheld radios to first responders in the field. Indicators/Benchmarks of success towards this objective include:
 - Develop a statewide communications interoperability plan in coordination with all state agencies, local governments and the Federal government.
 - Build out a statewide 700Mhz radio system which all users, state and local can ride-on.
 - Support individual jurisdictions with the implementation of 700/800Mhz radio systems.
 - Increase the number of Maryland regions (ie Eastern Shore, Central Maryland, Western Maryland, Southern Maryland and the NCR) with regional interoperability solutions.
 - To the extent possible deploy handheld radios to local jurisdictions and state agencies where gaps exist.
- *First responders in every region should have robust CAD/RMS systems capable of coordinating dispatch data for all response partners and capable of transmitting data to systems such as WebEOC for consolidation and roll up of regional CAD data.* Ensuring that all state and local law enforcement agencies have access to modern CAD/RMS will require IT architecture to integrate state and local CAD systems in order to share, consolidate, and roll up regional data, sufficient bandwidth and the integration of state and local records management systems to share data with the MCAC, MJOC, and local CAD. Indicators/Benchmarks of success towards this objective include:
 - Build out a statewide CAD/RMS system interoperable with as many state and local first responder agencies as possible.
 - Increase the number of state agencies and local jurisdiction sharing CAD/RMS data with one another and the state law enforcement and first responder agencies through CAD-to-CAD and RMS links.
- *Enhance information sharing across jurisdictions and disciplines by utilizing interoperable architecture and applications to include incorporating the next generation GIS-based/situational awareness common platform for Maryland and disseminate it to state and local partners.* Enhancing information sharing and developing next generation GIS-based situational awareness capabilities across jurisdictions and disciplines will require the integration of existing and new information systems and databases in order to create an electronic information sharing platform that all first responders can access. It will also require that a GIS-based situational awareness platform that uses next generation technologies is deployed and shared across state and local partners. Indicators/Benchmarks of success towards this objective include:
 - Build out a new and improved GIS tool for emergency management and public safety which to the extent possible is interoperable with a variety of information sharing systems.
 - Maximize the number of first responder agencies connected to Maryland's iMAP and new and improved GIS public safety tool.
 - Maximize the number of data streams feeding into the GIS public safety tool.

Strategy 2 – Integrating Intelligence/Information Sharing Capabilities across Law Enforcement and Public Safety Entities

Agency Lead(s): Maryland State Police

Background: There is a wealth of potentially valuable information available to protect the life and safety of the public and first responders. However, that information is not useful unless trends are identified, analysis is completed, and the information is channeled to those with a need to know. Providing first responders with meaningful intelligence supports operational decision making, assists in ongoing investigations, and enhances first responder safety. Developing meaningful intelligence is a three step process: first, the collection of raw data, second the analysis of raw data to develop actionable intelligence, and finally, the distribution of that intelligence to those that need it.

Consistent with the foundation of Governor O’Malley’s homeland security policy, that the homeland security mission must be integrated into the daily operations of departments and agencies, intelligence and information sharing at the state fusion center has been shifted from “terrorism only” to “all crimes.” Maryland adopted a “hub and spoke” model to increase the utility of intelligence to local law enforcement and improve data collection by opening three Regional Information Centers (RICs) in southern, eastern, and western Maryland. The combination of these two changes (adding a regional structure and adjusting the focus to all crimes) has resulted in better and more relevant intelligence products.

Sub-Goal: Law enforcement officers in every region in Maryland should have the ability to transmit and receive law enforcement database information from the field and share that information on a real-time basis. Maryland’s fusion center should share useful and actionable information from the field and from regional and federal counterparts with every jurisdiction on a real time basis.

Implementation Actions/Targets: Ensuring that Maryland’s intelligence and information sharing goals are met will require the following key components:

- *Integrate relevant/appropriate existing law enforcement and other data systems relevant to homeland security in order to transmit and receive law enforcement database information from the field and share that information on a real-time basis.* Integrating relevant law enforcement and other homeland security related data systems and sharing that information in real-time will require the development of an information sharing structure that addresses local and regional issues, the implementation of technology to share information between currently incompatible criminal and homeland security intelligence databases, and the deployment of modern and next generation hardware and software into the field so that first responders have the ability to share information real-time. Indicators/Benchmarks of success towards this objective include:
 - Increase the number of state, regional, and national information sharing systems feeding into the Maryland Coordination and Analysis Center (MCAC).
 - Maximize the number of shared databases across local, state, and Federal government agencies throughout Maryland.
 - Develop a GIS capacity at the MCAC to include the ability to map data On-Command for state and local jurisdictions.
 - Fully implement an Intel case management system and capable of federated searches and Suspicious Activity Report SAR production.

- *State and Local first responders should work together to develop a statewide information sharing model that uses common information sharing standards, produces products useful to field personnel as well as executive decision makers, and works on a real time basis.* Developing a statewide information sharing model that produces useful products to field personnel and executive decision makers, and that works on a real time will require the development common protocols to identify, collect and analyze information, and the production of meaningful and practical Intel products by the Maryland Coordination and Analysis Center for use at the state and local level. Indicators/Benchmarks of success towards this objective include:

- Develop a Strategic Plan, Information Sharing Model, and a Concept of Operations for the MCAC
- Develop common technology protocols/metadata to be able to share information with local, state, and Federal government information sharing/mapping systems
- Fully develop Regional Information Centers staffed with state and local personnel that work together to collect/share/analyze raw law enforcement data, and produce meaningful intelligence products for state, regional, and local intelligence/law enforcement agencies.
- Develop a set of intelligence products including: Regional Crime Analyses, State Crime Trend Analyses, Special Intel Analyses (commodities, financial, drug), and Terrorism-related Analyses for Local, and State law enforcement, and senior-level state executives.

Strategy 3 – Ensuring Comprehensive HAZ MAT/Explosive Device Response Capacity for All Maryland Regions

Agency Lead(s): Maryland Department of the Environment,
Office of the State Fire Marshall

Background: Hazardous materials (hazmat) and explosive device teams provide the specialized field response to threats such as an intentional chemical release, suspicious package, or improvised explosive device. These teams receive training and equipment particular to the unique hazards to which they respond - rendering safe dangerous conditions caused by chemical releases or explosives. Because the possibility of multiple simultaneous or coordinated events exists, maintaining strong lines of mutual aid between teams provides redundancy and increased coverage in response.

Under Governor O'Malley the state has overcome an information gap on the capabilities of bomb and hazmat teams statewide and has focused on developing and tracking equipment, capabilities, and response time. The responsibilities for the unique situations involving chemicals or suspected explosives are distributed across a variety of local and state entities and the state had collected very little data on statewide or regional capability. Overcoming information gaps and forging partnerships has become the main area of focus as the state looks to form a more cohesive and coordinated response coalition. Notably, the OSFM in partnership with MEMA created a system to track OSFM bomb squad response times, and for the first time, local bomb squads have begun to share response time data as well.

Sub-Goal Every metropolitan region should have a Type 1 HazMat team and a Type 1 bomb response team, either as one unit, or separate units, and there should be sufficient units statewide to provide a mutual aid response in any jurisdiction within a minimal amount of time. These teams should all be trained for both fire and law enforcement response.

Implementation Actions/Targets: Ensuring that Maryland has bomb squad and hazardous materials (hazmat) response capabilities available during a crisis requires the following components:

- *Every metropolitan region in Maryland should have access to a Type 1 bomb response and hazmat team, and those units should be able to provide mutual aid within a minimal amount of time. Achieving Type 1 level teams for bomb response and hazmat response requires a defined standard set of equipment and training with a consideration for emergent technologies, a formalized system of mutual aid for those jurisdictions that do not maintain their own teams, and a data sharing system to ensure effective response. Indicators/Benchmarks of success towards this objective include:*
 - Develop or adopt a standard for equipment and training to meet the Type 1 level.
 - Implement a system for sharing response times and other key data.
 - Formalize existing systems of mutual aid with formal MOUs or other agreements.
- *State and Local HazMat and Bomb Teams should be trained for both fire and law enforcement response and to handle unique WMD/CBRNE incidents. Many homeland security scenarios involve both explosives and hazardous materials, as such the State must coordinate cross training needs so that hazmat teams can support and effectively coordinate with all law enforcement response and bomb squad teams are prepared to deal with hazardous materials. Indicators/Benchmarks of success towards this objective include:*

- Train hazmat teams in law enforcement skills such as evidence collection.
- Train bomb squad teams in safely dealing with potentially hazardous materials during a bomb response.

Strategy 4 – Ensuring Access to Specialized, Operational Personal Protective Equipment for First Responders

Agency Lead(s): Maryland Emergency Management Agency

Background: Protecting the lives of our first responders is essential so that they can continue to protect the lives of the public. First responders may be called upon to operate in extremely dangerous environments and require specialized equipment that is not always necessary in day-to-day operations. Specialized personal protective equipment includes additional breathing apparatus, chemical suits, gloves, and boots as well as medications and protective treatments to guard against the effects of chemical, biological, and radiological agents. Routine training and exercising is necessary so that first responders have the opportunity to become familiar with specialized equipment and to ensure that it operates correctly when needed.

The State has focused on organizing, standardizing, and collecting and disseminating useful information on the PPE available and currently in-use within their borders to State agencies and local jurisdictions. In 2007, when Governor O’Malley took office, PPE for State law enforcement officers was not widely available, procurement was uncoordinated, and training and fit-testing were disorganized. Local jurisdictions in the state had little or no information on the PPE used by their neighboring fire and police departments. At the direction of the Governor in 2008 the State identified a single uniform package (chemical suit, air mask, gloves, etc) for patrol officers in the State’s five major law enforcement agencies (MDSP, MDTAP, MTAP, DNRP, and DGSP). All patrol officers within any of these agencies will receive the same equipment, training and testing.

Sub-Goal All police officers, firefighters, and emergency medical providers in every metropolitan region should have ready and immediate access to personal protective equipment, including at a minimum some form of emergency airway protection, access to more advanced breathing apparatus and protective suits, and medications and antidotes against common weapons of mass destruction (WMD) agents, and the training to use this equipment properly. All police officers, firefighters, and emergency medical providers in rural regions should have ready and immediate access to personal protective equipment appropriate to local hazards.

Implementation Actions/Targets: Ensuring that first responders in Maryland have the Personal Protective Equipment (PPE) they need requires the following components:

- *All police officers, firefighters, and emergency medical providers in every region should have ready and immediate access to personal protective equipment, including at a minimum some form of emergency airway protection, access to more advanced breathing apparatus and protective suits.* Ensuring first responders have ready access to PPE will require a regularly maintained inventory of State and local first responder PPE capabilities, a system for coordinated acquisition of compatible PPE and breathing protection, and training on the use and maintenance of PPE.

Indicators/Benchmarks of success towards this objective include:

- Completion of a statewide census of PPE capabilities
- Development of a standard set of PPE for first responders
- Development of a procurement vehicle for State and local first responders to purchase the same PPE

- *All police officers and firefighters in metropolitan and rural regions should have access to medications and antidotes against common CBRNE/WMD agents.* The provision of first responders with access to medications and antidotes to common CBRNE agents including those that might be used in WMD is critical to homeland security.

Indicators/Benchmarks of success towards this objective include:

- Ensure sufficient antidote kits are available in EMS units across the state to meet HRSA standards based on jurisdictional population.

- Identify expiration dates for medicines and antidotes and provide policies to ensure that supplies are continuously refreshed.
- Maintain the State's Strategic National Stockpile Plan and regularly exercise that plan.

Strategy 5 – Achieving Biosurveillance Preparedness Statewide

Agency Lead(s): Department of Health and Mental Hygiene

Background: Biosurveillance provides early warning of an epidemic or outbreak and enhanced tracking through the real-time monitoring of health and environmental data. Public health biosurveillance focuses on the symptoms presenting in hospitals, doctor's offices, and indicators of symptoms from other health data sources to assist in identifying both naturally occurring outbreaks such as seasonal influenza or intentional acts such as the release of anthrax or chemical poison. Biosurveillance is not limited to medical data but also includes the monitoring and tracking of air and water for contamination due to accidents or intentional acts.

Governor O'Malley has established a focus on early detection, surveillance, and situational awareness to mitigate the threat of both naturally occurring and manmade biological hazards. This includes increasing surveillance of public health indicators and monitoring sensor data for chemical or radiological releases or aberrations. The build-out of automated computer biosurveillance systems and the expansion systems to include more information from more partners, and the effort to bring statewide air monitoring systems online for real-time detection of chemical and radiological releases is ongoing and has improved real-world responses such as during the recent H1N1 pandemic. Notably, in 2009, Maryland achieved full connectivity into the State's automated public health syndromic biosurveillance system, ESSENCE, for all 46 acute care hospitals in the State, expanding our capacity for comprehensive real-time analysis of statewide biosurveillance trends.

Sub-Goal: Every region in Maryland should have access to a real-time, 24/7 statewide biosurveillance system that incorporates a wide span of data, including symptoms presenting in emergency rooms and to paramedics, over-the-counter sales of pharmaceuticals, animal carcass pick up, and in metropolitan areas, sensor-based data, such as air monitoring for chemical and radiological releases.

Implementation Actions/Targets: Ensuring implementation of comprehensive biosurveillance preparedness in Maryland requires the following key components:

- *Every region in Maryland should have access to a real-time 24/7 bio-surveillance system.* Access to a fully-integrated 24/7 biosurveillance system will require that Maryland maximizes participation from hospitals, pharmacies, and other key sources of bio-related information in bio-surveillance systems, and maximizes the number of data elements feeding into these systems. Indicators/Benchmarks of success towards this objective include:
 - Connect every acute care hospital to the ESSENCE biosurveillance system.
 - Provide all hospitals access to own ESSENCE data and as a comparison to aggregate data.
 - Increase number of pharmacies reporting to ESSENCE.
 - Increase number of physicians included in DHMH rapid outreach communications list.
 - Include poison control data.
 - Include school and sentinel employer absentee data into ESSENCE.
 - Include prescription pharmaceutical data into ESSENCE to include anti-virals.
- *Maryland's metropolitan areas should have sensor-based data to monitor for chemical and radiological releases.* Sensor-based data completion requires metropolitan areas to have a system of sensors capable of monitoring for chemical and radiological release surrounding pre-identified target sites and areas which is capable of feeding information in real-time to key state and local partners. Indicators/Benchmarks of success towards this objective include:
 - Build out new chemical and radiological sensors to cover critical areas.

- Link new and existing chemical and radiological sensors.

Strategy 6 – Completing a Statewide Vulnerability Assessment for Maryland’s Critical Infrastructure and Key Resources

Agency Lead(s): Maryland State Police

Background: Vulnerability assessments identify, quantify, and prioritize weaknesses in the security of critical infrastructure and key resources (CI/KR) due to threats resulting from natural or man-made hazards. These assessments provide security personnel with the necessary information to direct investments toward and implement new protective measures to harden key facilities and critical systems. Vulnerability assessment data must be secured but readily available to law enforcement, emergency management and other stakeholders during periods of heightened threat and during emergency response.

Under Governor O’Malley Maryland’s critical infrastructure program was expanded and integrated into the fusion center to improve information sharing between law enforcement and the private sector. The State’s efforts have focused on developing a common set of definitions for critical infrastructure, a standardized site assessment tool, and a common database accessible to all critical stakeholders. Through a partnership between state, local, and federal government and the private sector, assessments are underway on infrastructure and key resources such as Maryland’s waterways, power grid, bridges tunnels, stadiums, and water supply. These assessments are being used to provide information to assist in implementing new protective measures to harden key facilities and critical systems. The program’s priority is to continue to complete an inventory of all public and private critical infrastructures in Maryland – a list which will be continuously update, expanded, and improved

Sub-Goal: Every region in Maryland should have a comprehensive all-hazards threat and vulnerability assessment in place and fully updated every three years, including an assessment and inventory of critical infrastructure in the region. Maryland should have a complete inventory of critical infrastructure; including assets controlled by the private sector, and other potential targets, such as communities and populations of interest. This inventory should include a regularly updated assessment of specific vulnerabilities that identifies any major gaps where funds should be invested to harden the most vulnerable and at-risk targets.

Implementation Actions/Targets: Ensuring that Maryland’s vulnerability assessment goals are met will require the following key components:

- *Maryland should have a complete inventory of critical infrastructure, including assets controlled by the private sector, and other potential targets, such as communities and populations of interest.* Developing a complete inventory of critical infrastructure in Maryland will require the development and implementation of a single format/tool for site visits and use a unified statewide database for storing critical infrastructure information and regularly update data within this tool. The sites identified in the database should also be ranked and prioritized based on threat, and major gaps should be identified so that funding can be directed toward hardening at risk targets. Cooperation and coordination with the private sector in collecting and analyzing information on privately held critical infrastructure will be a key component to this goal as well. Indicators/Benchmarks of success towards this objective include:
 - Maximize state agency and local government participation in the ACAMS CIP database/information-collection-tool in Maryland.
 - Maximize the number of state and local personnel trained to use ACAMS and PCII certified.
 - Develop a Maryland-specific set of definitions for each of the 18 CI/KR sectors.
- *Every region in Maryland should have a comprehensive all-hazards threat and vulnerability assessment in place and fully updated every three years, including an assessment and inventory of critical infrastructure in the region.* Ensuring that every region in Maryland has a comprehensive all-hazards threat and vulnerability assessment will require regular statewide vulnerability assessments performed by the MCAC, a process for assessing critical

infrastructure in the region, and state and local access to a critical infrastructure cataloging tool .

Indicators/Benchmarks of success towards this objective include:

- Develop a method for assessing physical CI/KR in Maryland such as the “Cluster Method” that reflects reality in that the immediate impact of specific CI/KR will be the area surrounding that CI/KR.
- Develop a method/process for assessing virtual CI/KR such as information sharing systems, financial information sharing systems, critical resources managed in a virtual world.

Strategy 7 – Implementing Robust Instructional Training and Exercise Programs for all Maryland Regions

Agency Lead(s): Maryland Emergency Management Agency

Background: Training and exercise prepares first responders, validates plans, and reinforces capabilities needed during an emergency. Training consists of classroom and hands-on lessons in subject-matter areas important to first responders and emergency managers. Exercises are scenario driven practice sessions, such as table-top talk-only drills as well as full-scale drills where responders execute actual operations in the field. Closely related to training and exercises are after-action examinations to ensure that lessons learned during an exercise can be applied during a future event.

Governor O’Malley placed a priority on coordinating training and exercises across State government and between local jurisdictions to ensure that first responders are prepared and capable of providing first-line and mutual aid response during large-scale or unusual emergencies such as a WMD attack. MEMA is exploring cutting edge technology solutions such as serious gaming and using data collection to identify and fill potential training gaps across the state. MEMA cooperates with State partners and local jurisdictions to provide targeted training on homeland security paired with timely exercises based on likely threat-scenarios. Maryland has increased the number of exercises and training available to State and local officials each year since 2007 including an increase in the number of exercises performed in 2009 from 2008 by 25%; performing 24 exercises up from 20 the previous year and an increase in the number of training courses offered from 134 in 2008 to 162 in 2009 representing a 21% increase.

Sub-Goal: Every region in Maryland should have a fully funded program of annual training and preparedness exercises which address the most likely hazards and threats for that area, including drills with partner jurisdictions who may provide mutual aid at least twice per year. The training and exercise program should include refresher training on specialized and personal protective equipment and exercise in core competency areas such as the use of interoperable communications equipment.

Implementation Actions/Targets: Ensuring that ample training and exercises are available requires the following components:

- *Every region in Maryland should have a fully funded program of annual training and preparedness exercises which address the most likely hazards and threats for that area.* To achieve a full program of annual training and exercises the State must develop statewide exercise and training strategy and support local jurisdictions and State Agencies in the development of exercises which support core homeland security goals. Indicators/Benchmarks of success towards this objective include:
 - Provide exercise assistance to all jurisdictions upon request.
 - Perform exercises in each region of the state according to identified hazards or gaps.
 - Exercise each State Emergency Support Function annually. Emergency Support Functions are a collection of agencies with responsibility for core emergency functions.
 - Ensure all jurisdictions and State agencies are National Incident Management System compliant.
 - Offer trainings in locations across the state on diverse topics.
- *All training and exercise after-action reports and improvement plans should be integrated into existing procedures to improve statewide, regional, and local preparedness.* Ensuring that after-action reports and improvement plans are implemented requires that a system and process is in place to ensure compliance. The State must also assist local

jurisdictions in the development and implementation of improvement plans specific to their jurisdiction.

Indicators/Benchmarks of success towards this objective include:

- Develop a formal system and process for developing and implementing improvement plans and recommendations from after-action reports at the State level
- Provide assistance to local jurisdictions upon request.

Strategy 8 – Implementing a Statewide CCTV System

Agency Lead(s): Maryland Department of Transportation

Background: Closed Circuit Television (CCTV) is critical to provide situational awareness of events, serve as a preventative presence to deter crime, manage traffic congestion and incidents, and for criminal investigation. CCTV is deployed in areas such as ports, airports, tunnels, highways, street corners, busy intersections, and surrounding critical infrastructure. When paired with advanced technologies such as night vision, pan/tilt/zoom (PTZ) capability, suspicious package identification, and optical character recognition (used for vehicle identification) CCTV can better identify threats and secure critical areas.

At the direction of Governor O’Malley, Maryland began an effort to create a statewide CCTV system by identifying and cataloging cameras and capabilities, networking those cameras, and providing an interface so that necessary video can be disseminated where it is needed. The cataloging and networking of cameras coupled with the development of a legal and policy framework for video-sharing will support a truly statewide camera system integrating State, local, and private video. The State has also continued to build-out new state-of-the-art CCTV systems at critical infrastructure and other locations and is pursuing pairing cameras with companion technologies such as license plate recognition and radiation sensors.

Sub-Goal: Maryland should have a robust closed circuit television (CCTV) network to secure critical infrastructure such as power and water treatment plants and to provide the ability to monitor events in real time via means such as highway cameras to aid in evacuation control, and patrol car, helicopter, and marine unit downlinks to aid in incident response. Images should transmit to IP in order to be portable to and from key local and state facilities, such as emergency operations centers and mobile command posts.

Implementation Actions/Targets: Ensuring that Maryland’s CCTV goals are met will require the following key components:

- *Maryland should have a robust and interconnected CCTV system that secures private and public critical infrastructure.* Developing a robust and interconnected CCTV system will require the integration of various currently individual systems including those that monitor key public resources and critical facilities. In order to integrate the various systems a technology bridge between private CCTV systems and the State system to allow for State monitoring if necessary. Additionally, facilitating improvement of private critical infrastructure security by assisting private partners in the planning necessary for CCTV surveillance of their privately held infrastructure and resources. Indicators/Benchmarks of success towards this objective include:
 - Develop a Concept of Operations for a Statewide CCTV System.
 - Develop a video bridge technology enhancing the state’s capability to integrate and capture all video formats.
 - Increase the number of state/local governments/private sector entities connected to the state’s central CCTV system.
- *Maryland’s CCTV network should provide the ability to monitor events in real time via means such as highway cameras to aid in evacuation control, and patrol car, helicopter, and marine unit up/downlinks to aid in incident response.* Developing a CCTV network that provides the ability to monitor events in real time will require the development of a comprehensive vehicle based CCTV system for first responders in patrol cars, helicopters, and

marine units with a means for video upload and download. Additionally the network will require the capability to disseminate CCTV video to assist in evacuations and incident response. Indicators/Benchmarks of success towards this objective include:

- Expand use of the CCTV bridge-technology to helicopters, vessels and vehicles across Maryland
- Develop and expand CCTV access through Personal Digital Assistants (PDAs)
- Develop an integration plan for CCTV/video sharing capability in the National Capital Region.
- Develop an in-vessel video initiative to share vessel images with command centers such as the MCAC and MJOC

Strategy 9 – Achieving Full Mass Casualty/Hospital Surge Response Preparedness for all Maryland Regions

Agency Lead(s): Department of Health and Mental Hygiene,
Maryland Institute for Emergency Medical Services Systems (MIEMSS)

Background: A mass casualty event is any incident in which emergency medical services personnel and equipment at the scene are overwhelmed by the number and severity of casualties, and could include a train accident or an incident in a location such as a stadium where hundreds or thousands could require medical treatment. Hospital and health system surge is an increase in the overall stress on the entire health system, from paramedics and individual doctor's offices to emergency rooms and critical care units. A surge could result from a mass casualty incident or also during pandemic influenza or other disease outbreaks as an increased number of sick or injured patients require medical attention. Increasing the capacity to deal with mass casualty incidents or health system surges is accomplished by robust local hospital surge plans, tracking and sharing resources on-hand in hospitals, stockpiling and distributing resources from supply caches, and tracking hospital emergency department stress and bed availability.

The State has focused on initiatives to better plan for and coordinate during surge events, to automate and combine various situational awareness and surveillance tools into single dashboard, and to provide additional human, medical, and transportation resources to public and private stakeholders. Notably, in 2009 MIEMSS developed and implemented a single dashboard IT system capable of housing health and medical data and integrated two of Maryland's most critical public health systems for tracking EMS units, resources, and hospital emergency room data.

Sub-Goal: Every region in Maryland should have the equipment, supplies, and training to respond to a mass casualty event either directly or via close at hand mutual aid, including events requiring mass decontamination. Maryland should have pre-identified surge plans from area hospitals that identify likely gaps in hospital resources, a statewide information sharing systems between hospitals (both electronic, and MOU-type agreements), supply stockpiles, and emergency plans for alternate treatment, such as temporary field hospitals.

Implementation Actions/Targets: Ensuring robust and capable mass casualty and hospital surge preparedness in Maryland requires the following components:

- *Maryland hospitals, public health, and EMS should have the technological infrastructure and information system in place in order to share information on medical resources needed for every day, and mass-casualty/hospital surge events.* To ensure preparedness in the State's already world-class emergency medicine, public health and hospital system there must be infrastructure in place to allow for information sharing, resource tracking, and patient tracking as well as backup and alternate communications. Indicators/Benchmarks of success towards this objective include:
 - Continue the integration of health IT systems into the Health and Medical Dashboard.
 - Continue the roll-out of patient tracking hardware and software to EMS units at the local level.
 - Provide access to PSINet voice-over-IP phone access in all emergency rooms and hospital EOCs.
 - Provide all emergency rooms and hospital EOCs in all acute care hospitals with satellite phones.
- *Every region in Maryland should have pre-identified surge plans from area hospitals, public health, and EMS which are reviewed regularly to identify likely gaps in resources.* Planning is a key component to public health preparedness

and must include robust surge plans for all aspects of the health system but also the supplies and training to implement those plans. Indicators/Benchmarks of success towards this objective include:

- Review all hospital level surge plans and deconflict them.
 - Review all local public health office surge plans and deconflict them.
 - Complete the State surge plan.
 - Continue to maintain the State’s medical supply and strategic national stockpile warehouse
 - Buy all federally subsidized antivirals.
- *Every region’s public health agencies, EMS jurisdictions, and Maryland’s hospitals should have MOU-type agreements to share resources in cases of mass casualty incidents.* A prepared hospital and public health system must have mechanisms, whether MOU agreements or other such agreements, to provide for the sharing public health resources in a time of need. Indicators/Benchmarks of success towards this objective include:
 - Ensure all healthcare system surge plans include necessary MOUs
 - Collect and deconflict hospital-to-hospital MOUs
 - *Every regions public health agencies, EMS jurisdictions, and Maryland’s hospitals should have the equipment, training and supplies to respond to a mass casualty incident, including emergency plans for alternate treatment, such as temporary field hospitals.* Preparing for a mass casualty event requires access to trained EMS providers with access to the supplies and transportation resources necessary to handle a large influx of patients. In addition, these technicians must be prepared to perform mass decontamination in the event of a chemical, biological, or radiological incident. Indicators/Benchmarks of success towards this objective include:
 - Completely staff the State’s National Disaster Medical System Disaster Medical Assistance Team.
 - Develop the State’s Disaster Medical Assistance team.

Strategy 10 – Completing Comprehensive Emergency Response Planning for all Maryland Regions

Agency Lead(s): Maryland Emergency Management Agency

Background: Planning pre-assigns roles and responsibilities, and pre-identifies resources to minimize the confusion often present during emergencies and ensures that the capacity exists to respond to potential incidents. Plans should anticipate the needs of all citizens including the most vulnerable populations – the transportation disadvantaged, the elderly, and persons with disabilities. Emergency planning should address both specific emergency functions such as search and rescue as well as likely hazards such as hurricanes or winter storms.

One of Governor O’Malley’s first acts as Governor was to retain renowned emergency management expert and former FEMA Director James Lee Witt to perform a top to bottom assessment of the Maryland Emergency Management Agency and the State’s core emergency operations plan. Since the completion of this study in January 2008 the State has implemented a host of improvements recommended by Witt including reestablishing the previously defunct planning division within MEMA. Maryland has also adopted the Comprehensive Emergency Management Planning system to provide a framework to coordinate and better organize state emergency operations plans and various hazard specific annexes. MEMA has lead new emergency-specific efforts to more pro-actively identify planning gaps and to collect and validate plans according to central principals such as continuity of operations planning (COOP) during the recent H1N1 event. Notably, the State’s Core Plan for emergency operations was signed by Governor O’Malley on August 26, 2009, the plan lays out the roles and responsibilities of the departments and agencies within the state enterprise during emergencies.

Sub-Goal: Every region in Maryland should have the capacity to develop plans to conduct no-notice and advance notice evacuation of its population, including special needs populations, persons without transportation, and vulnerable facilities such as hospitals, nursing homes, and assisted living centers—and in conjunction with partners, access to the equipment, personnel and supplies to carry out these plans. Every region should have plans and the capacity to set up mass shelters,

including accommodations for special needs populations and pets. Plans should be shared and coordinated regionally and exercised annually at least at the tabletop level.

Implementation Actions/Targets: To ensure a strong planning system is in place for Maryland will require the following components:

- *Every region in Maryland should implement plans for no-notice and advance notice evacuation of its population to include those with special needs.* Providing for quality notice and no-notice evacuations plans will require the State to continue to support the emergency planner program for local jurisdictions the incorporation of special needs populations into plans, and the sharing, coordination and exercise of all plans. Indicators/Benchmarks of success towards this objective include:
 - Continue to fund local planners in each local jurisdiction.
 - Develop planning checklists for notice and no-notice evacuation events.
 - Inventory special needs populations' evacuation plans or annexes in local jurisdictions.

- *Every region in Maryland should have plans and MOU agreements to set up mass shelters that include accommodations for special needs populations and pets.* Providing for mass shelters with special needs accessibility and companion animal capability will require the development of State and local level sheltering plans, support to local jurisdictions in planning, sharing of plans, and MOU agreements with large shelters. Indicators/Benchmarks of success towards this objective include:
 - Develop sheltering plans including special needs populations and companion animals in local jurisdictions.
 - Finalize design for pre-placed companion animal kennels for pet sheltering.
 - Execute MOUs with mass shelter locations in regions across Maryland.
 - Complete the State Mass Care Shelter Strategy

- *State and local resources should be typed to enable seamless, real-time tracking and distribution.* In order to ensure that resources are available during emergencies the State must have a comprehensive resource typing system, resource tracking software, and a system of maintenance for resource listings of both state and locally controlled resources that is updated in real-time. Indicators/Benchmarks of success towards this objective include:
 - Develop MOUs with the private sector to provide resources during emergencies.
 - Build out the state's emergency procurement contracts.
 - Systematically update State resources in the State's resource tracking systems.

Strategy 11 – Ensuring Backup Power and Communications Preparedness for all Maryland Regions

Agency Lead(s): Maryland Emergency Management Agency

Background: Maintaining power generation and the ability to communicate are critical during virtually every emergency situation. Hardening the power and communications infrastructure in public facilities such as Emergency Operations Centers and 911 Call Centers and at infrastructure owned and operated by the private sector is critical to maintaining continuity of operations. Power and communications are among the most essential functions for evacuation and sheltering operations.

The State's efforts have focused on continuity of power and redundant means of communication as two of the most basic capacities necessary for any operation. Prior to the O'Malley Administration's focus on this key area, the State had little or no information on the availability of generators or pre-wiring for generators at the local level, continuity of operations planning was disorganized and uncoordinated, and while redundant communications existed the State had inaccurate or incomplete information on those assets. In order to address these key areas the State has focused on inventorying and identifying gaps in backup power and communications resources and in planning to ensure continuity of service and

government during times of need. Notably, in 2009 as preparation for the expected outbreak of H1N1 influenza the Governor ordered all executive departments and agencies updated and revised their COOP plans with the assistance of MEMA. MEMA has collected and assessed those plans and is also advising local jurisdictions on COOP planning in an on-going effort to ensure continuity of services and government during facility specific, agency specific, or large scale disasters affecting a governmental entity's ability to perform essential functions.

Sub-Goal: Every region in Maryland should have an inventory of pre-identified critical facilities, including privately owned facilities such as gas stations, and an up to date assessment of their backup power capabilities. The most critical facilities should receive permanent backup generators or be prewired for power from mobile units, and a stockpile of publicly owned or inventory of privately-owned generators should be maintained. Every region should have a backup 911 system, whether it is an alternate facility or the means to roll calls over to a neighboring jurisdiction.

Implementation Actions/Targets: Ensuring that the State is prepared for loss of electrical power and traditional communications capabilities requires the following components:

- *Every region in Maryland should have an inventory of pre-identified critical facilities, including privately owned facilities such as gas stations, an up to date assessment of their backup power capabilities and Maryland's most critical infrastructure should receive permanent backup generators or be prewired for power from mobile units.* Ensuring backup power resources are available in times of crisis will require the identification and prioritization of critical publicly and privately controlled and their existing capabilities, an inventory of publicly owned backup power resources, and a stockpile or emergency contract for mobile generators. Indicators/Benchmarks of success towards this objective include:
 - Complete comprehensive survey and inventory of backup power resources controlled by the state.
 - Complete a census of critical facilities for State and local government.
 - Pre-identify backup power resources and/or contracts for acquiring those resources.
- *Every county should have, or have a regional agreement for, a backup 911 system. That system could be an alternate facility or an agreement with a neighboring jurisdiction.* Facilitating short and long term 911 service continuity will require backup procedures and equipment and facilities while also requiring agreements for roll-over of calls and mutual aid for short and long term outages. Indicators/Benchmarks of success towards this objective include:
 - Provide Telecommunications Service Priority (TSP) to Maryland 911 Centers to ensure preferential treatment when adding new lines or having lines restored following a disruption of service, regardless of the cause.
 - Ensure 911 Centers have the capability of continuing service through clone facilities and MOU agreements with neighboring jurisdictions.
- *All Maryland agencies and local jurisdictions should have Continuity of Operations Plans (COOP).* Maintaining Continuity of Operations during disasters will require that all State agencies have up-to-date COOP plans, all local jurisdictions have COOP plans, and a system or process is in place to regularly maintain those plans. Indicators/Benchmarks of success towards this objective include:
 - Complete submission and review of all Maryland Executive Branch agency COOP plans.
 - Collect and inventory COOP plans from all local jurisdictions.
 - Provide COOP training as requested.

Strategy 12 – Ensuring Robust Transportation Security in Maryland

Agency Lead(s): Maryland Department of Transportation

Background: The transportation network - air travel, roads, highways, bridges, tunnels, the waterways, ports, and railways - is one of the most vital critical infrastructure systems and has been a target of terrorist attacks around the world. Each of these areas of transportation infrastructure requires specific and unique measures to ensure the safety of those

traveling on them and for those living around them. Responsibility for securing this network cuts across jurisdictional lines and includes the development of sound evacuation plans, the deployment of CCTV to monitor major highways and busy roadways, stopped vehicle detection technologies to identify vehicles stuck in a tunnel or on a bridge, and the regular vulnerability assessment of critical infrastructure.

Under Governor O'Malley the State has focused its transportation security efforts on conducting comprehensive vulnerability assessments and hardening key transportation assets such as airports, ports, bridges and tunnels with physical countermeasures including CCTV and access control systems, and integrating various security enhancements to create redundant and multilayered protection. Successfully securing Maryland's transportation assets requires coordination across many agencies, jurisdictional boundaries, and with private sector partners.

Sub-Goal: Maryland's water ports, airports, train stations, subways, and rail lines should be fully hardened against attack with permanent physical countermeasures such as CCTV, lighting and fencing, and receive regular and randomly assigned heightened attention from covert and overt patrols by local and state law enforcement. Local and mutual aid first responders should be issued specialized equipment needed to operate in these unique environments, such as radios capable of operating underground and extended life breathing apparatus, and participate in annual on-scene exercises involving likely threat scenarios.

Implementation Actions/Targets: Ensuring that Maryland's transportation security goals are met will require the following key components:

- *Maryland's waterways, including ports and maritime facilities, should be fully hardened against attack with permanent physical countermeasures and heightened attention from patrols by local and state law enforcement.* Securing Maryland's waterways will require regularly updated vulnerability assessment of port and maritime facilities, implementation of necessary physical countermeasures, surveillance systems, and patrols, and ensuring that response partners have PPE and communications equipment necessary for a response in environments unique to maritime/port environments. Indicators/Benchmarks of success towards this objective include:
 - Implement a vessel tracking and surveillance system capable of locating and receiving information about vessels travelling on Maryland's waterways.
 - Implement an external and internal CCTV system at the Port of Baltimore.
 - Implement an interim interoperability solution for Maryland's maritime environment.
 - Standardize the type of personal protective equipment used by first responders on Maryland's waterways.
- *Airports should be fully hardened against attack with permanent physical countermeasures and heightened attention from patrols by local and state law enforcement.* Securing Maryland's airports will require regularly updated vulnerability assessment of airport facilities, implementation of necessary physical countermeasures, surveillance systems, and patrols, and ensuring that response partners have PPE and communications equipment necessary for a response in environments unique to airports. Indicators/Benchmarks of success towards this objective include:
 - Build out and airport wide CCTV system at BWI Airport.
 - Implement a new CAD/RMS system at the BWI Airport in collaboration with the State's CAD/RMS system
 - Build a state-of-the-art access control system at the BWI Airport.
- *The Rail/Train System should be fully hardened against attack with permanent physical countermeasures and heightened attention from patrols by local and state law enforcement.* Securing Maryland's rail and train systems will require regularly updated vulnerability assessment of all passenger and freight rail resources and facilities, implementation of necessary physical countermeasures, surveillance systems, and patrols, and ensuring that response partners have PPE and communications equipment necessary for a response in environments unique to rail transit. Indicators/Benchmarks of success towards this objective include:
 - Expand on current passenger rail CCTV systems with a goal of covering all key points of interest identified by MTA and other transportation security stakeholders.
 - Build out a passenger rail CBRNE detection system across the metro and other passenger rail lines.

- *Maryland's highway system, including bridges and tunnels, should be fully hardened against attack with permanent physical countermeasures and heightened attention from patrols by local and state law enforcement.* Securing Maryland's highway system, bridges, and tunnels will require regularly updated vulnerability assessment of bridges and tunnels, implementation of necessary physical countermeasures, surveillance systems, and patrols, and ensuring that response partners have PPE and communications equipment necessary for a response in environments unique to Maryland's bridges and tunnels. Enhanced cargo screening of commercial vehicles in Maryland with additional sensors, x-ray, video and other enhanced screening technologies will also be an important component.

Indicators/Benchmarks of success towards this objective include:

- Develop enhanced security systems with access control, CCTV, perimeter defense, and stopped vehicle detection capability at Maryland major bridges and tunnels.
- Build out communications systems for full communications interoperability and operability in Maryland's tunnels.
- Deploy specialized PPE to first responders managing specialized events such as those in tunnels and on bridges.