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Maryland General Assembly
House Emergency Medical Services Workgroup
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Delegate Marvin E. Holmes, Jr., Vice Chair

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Report of the House Emergency Medical Services System Workgroup

Background

Formation of House Emergency Medical Services System Workgroup

In January 2009, Speaker Michael E. Busch formed a 14-member House of Delegates’ Workgroup to explore a range of cross-jurisdictional issues related to the organization, operation, safety, and efficiency of the Maryland Emergency Medical Services System (EMS System). Formation of the workgroup was prompted by three recent events: (1) an August 14, 2008 performance audit conducted by the Office of Legislative Audits (OLA) which examined and identified issues regarding the Maryland State Police Aviation Command (MSPAC) helicopter maintenance program; (2) the September 2008 crash of the MSPAC Trooper 2 medical evacuation (Medevac) helicopter resulting in the deaths of three crew members and one patient and serious injury to a second patient; and (3) the State’s plan to begin replacing its aging helicopter fleet with the purchase of new helicopters slated for acquisition in fiscal 2010.

The House Emergency Medical Services System Workgroup (EMS Workgroup), under the leadership of its Chairman, Delegate John L. Bohanan, Jr., convened at the beginning of the 2009 legislative session and met over the course of six weeks to take testimony and gather information relevant to its charge. The workgroup identified a number of issues for study and organized itself into three separate subgroups so that all issues could be thoroughly vetted. The subgroups were chaired by Delegates Guy Guzzone, Marvin E. Holmes, Jr., and Richard B. Weldon, Jr.

Broadly, the workgroup’s inquiry focused on whether the system is operating in an efficient, effective, and safe manner and ultimately whether the EMS System is serving the best interests of the citizens of the State. Specifically, the workgroup sought to review the events of the past year that prompted its formation and to evaluate the EMS System’s response.

In large part, the workgroup finds that the EMS System has responded appropriately and swiftly to issues raised in the 2008 helicopter maintenance audit and to the tragic accident that occurred in September 2008. Further, the workgroup finds that the helicopter fleet replacement procurement is proceeding in a manner consistent with the demands of the EMS System and in the best interests of the citizens who rely on it.

However, the workgroup makes specific recommendations in this report to expedite safety upgrades; improve field provider training; consider different service delivery options for the provision of State helicopter maintenance; collect data and formulate final recommendations on the appropriate number of helicopters and helicopter bases necessary to provide statewide
EMS coverage; and to study the configuration of State trauma hospitals to ensure that the number and geographic coverage are optimal for the EMS System.

Most importantly, the workgroup finds that the system must remain dynamic and make all efforts to respond to technological and scientific advancements in the field of emergency medical transport and care with evidence-based reforms and with the goal of maintaining Maryland’s pre-eminence in the EMS field. Many of the issues surrounding EMS reforms and helicopter procurement are ongoing, and the workgroup feels strongly that continued critical oversight and evaluation is necessary as the process of responding to these serious issues continues.

**History of the EMS System**

The history of the State’s EMS System dates back to the 1960s when Dr. R Adams Cowley established a clinical shock trauma unit within the University of Maryland. At that time, Dr. Cowley partnered with the Maryland State Police (MSP) to transport patients at no charge by helicopter from the scene of an injury to a dedicated trauma center. His theory of care revolved around the “golden hour,” a measure of time within which a severely injured patient’s chance of survival is greatest if proper medical care is received. The combination of rapid evacuation and timely treatment of shock resulted in a significant drop in the mortality rate of seriously injured patients. It evolved into the first trauma system in the country.

The system was formalized in the early 1970s when education programs were implemented to train first responders and uniform standards of care were developed. In addition, transportation networks and communication systems were established. In 1973, Governor Marvin Mandel issued an executive order establishing the Maryland Institute for Emergency Medicine and a Division of EMS. Both entities were subsequently combined into the Maryland Institute for Emergency Medical Services Systems (MIEMSS).

In 1993, the General Assembly passed legislation establishing MIEMSS as an independent agency, governed by an 11-member EMS Board. In addition, the 1993 legislation created a Statewide EMS Advisory Council (SEMSAC), made up of various EMS System stakeholders. The SEMSAC, now a 29-member council, serves as the principal advisory body to the EMS Board.

The statewide EMS System in Maryland remains unique in the nation, in that a single emergency medical services system incorporates all components necessary to respond to emergency care needs. Uniform standards for the operation of the statewide system are in place for all major components of the system. This coordinated approach to emergency medical services across the State helps ensure that the appropriate level of emergency care is available to respond to each patient care emergency.
Emergency Medical Services System Governance and Protocols

MIEMSS Governance

Today, the EMS System is a coordinated statewide network that includes volunteer and career EMS providers, medical and nursing personnel, communications and transportation systems, nine designated adult trauma centers, almost 60 designated specialty referral centers and hospital emergency departments throughout the State.

As the agency responsible for coordination of this network, MIEMSS is statutorily charged with developing and updating a statewide EMS Plan. The plan delineates areas of focus for MIEMSS over a five-year period. The EMS Plan is intended to ensure effective coordination and evaluation of medical services delivered in the State. Among other components the plan includes criteria for the designation of trauma and specialty referral facilities; provisions for maintaining and enhancing the communications and transportation systems for emergency medical services; and provisions for the evaluation of emergency medical services personnel training. Broader goals and objectives for the continued development and operation of the system are also outlined in the plan.

Maryland’s EMS System is divided into five geographic regions. Each region has a Regional EMS Advisory Council composed of members who have an interest in EMS. Council responsibilities are defined by regulation, and council meetings typically cover a range of topics, including grants, training, EMS policies/protocols, legislation, and communications. Input from each Regional EMS Advisory Council is provided to the SEMCAC for recommendation to the EMS Board.

Subject to approval of the Governor, the EMS Board appoints an Executive Director for MIEMSS who, in turn, is responsible for the coordinating all aspects of the EMS System at the direction of the board and in coordination with the statewide EMS Plan. Specifically, Section 13-510 of the Education Article provides that the Executive Director of MIEMSS shall:

- coordinate a statewide system of emergency medical services;
- coordinate the five emergency medical service regions in the State;
- coordinate the planning and operation of emergency medical services with the federal, State, and county governments;
- coordinate the training of all personnel in the EMS System and develop the necessary standards for their certification or licensure;
coordinate programs of research and education that relate to emergency injuries and illnesses;

coordinate the development of centers for treating emergency injuries and illnesses;

coordinate the development of specialty referral centers for resuscitation, treatment, and rehabilitation of the critically ill and injured;

work closely with public and private agencies, health care institutions and universities involved with emergency medical services, SEMSAC, and the Medical Management Consultant Group;

administer State and federal funds for emergency medical services in the State;

work closely with the Maryland Fire and Rescue Institute (MFRI), which is responsible for basic training for emergency medical technicians;

assure continued improvement of transportation for emergency, critically ill, and injured patients by supporting the goals of career and volunteer systems throughout the State; and

implement all programmatic, operational, and administrative components of the institute.

The 11 members of the EMS Board are appointed by the Governor for four-year terms. The Governor designates one member as chairman of the board. Each appointed member is required to have demonstrated interest or experience in the delivery of emergency medical services and all slots require specific expertise. There are no term limits for EMS Board members; however, 9 of the 11 current members are serving their first or second term, while 2 members have served on the board since its establishment in 1993. Terms for most board members have either expired or will expire by the end of calendar 2009.

Funding for the EMS System is provided through the Maryland Emergency Medical System Operations Fund (MEMSOF), a statutorily established special fund consisting of motor vehicle registration fee surcharges. The history and ongoing viability of MEMSOF is discussed in detail later in this report.

Appendix 1 shows the organizational structure of MIEMMS.

Trauma Triage Protocols

A key responsibility of MIEMSS is the development and distribution of Maryland Medical Protocols for Emergency Medical Services Providers. These triage protocols provide a system of determining priority and appropriateness of medical treatment, transportation, and
place of care in emergent situations. The protocols guide the actions of EMS field providers as they respond to emergency transport calls and importantly, promote uniformity of care throughout the State.

The protocols are developed by a Protocol Review Committee, appointed by MIEMSS and made up of the EMS regional medical directors, physicians, nurses, and EMS providers and are ultimately approved by the EMS Board. All State-licensed and certified EMS providers, whether public or commercial, are required to function within the scope of practice defined by the protocols. The protocols are updated annually and efforts are made to limit more frequent changes so as to simplify dissemination and training. Any EMS provider can propose a change to a protocol through their medical director’s office for consideration by the Protocol Review Committee.

Field Protocols

In a regional system of care such as Maryland’s, field protocols provide that more acutely injured patients are transported quickly to designated trauma centers. In Maryland, the most severely injured patients are transported to the State’s Primary Adult Resource Center, the R Adams Cowley Shock Trauma Center or to the State’s Level I trauma center, the Johns Hopkins Hospital Adult Trauma Center. Less critically injured patients are transported to Level II or III trauma centers and some patients are directed to specialty centers based on the etiology of their injury (e.g., burn victims to specialty burn centers). As originally conceived by Dr. Cowley, rapid transport of critically injured patients to an appropriately equipped hospital saves lives. According to the National Study on the Costs and Outcomes of Trauma, the risk of death is 25% lower when care is provided in a regional Level I trauma center than when it is provided in a non-trauma center hospital.

Maryland’s field protocols encompass many of the standards developed nationally by the American College of Surgeons (ACS). The ACS Committee on Trauma published the first set of field triage criteria in 1986 and has since updated them periodically. The Protocol Review Committee within MIEMSS reviews all ACS protocol updates for inclusion in Maryland’s field provider protocols. According to a recent review of Maryland field protocols, there are only minor differences in the protocols utilized in Maryland and the ACS standards.

In the field, EMS providers classify patients as Category A, B, C, or D based on the severity of their injuries with Category A being the most severe. This assessment requires EMS providers to evaluate visible and detectable injuries to patients and also to consider injuries that are not apparent but are likely to have occurred based on the mechanism of injury. For instance, a patient who has been ejected from a moving vehicle has a high likelihood of internal injury regardless of whether the injury can be detected based on outward appearance and immediate vital signs.
In July 2008, new trauma triage criteria developed by the ACS were incorporated into the Maryland protocols. The July 2008 protocol update was based on new ACS criteria that eliminated certain mechanisms of injury that were found to have a less than 20% correlation with severe injuries. These mechanisms of injury included automobile rollover with restraints; vehicle extrication taking greater than 20 minutes; high speed crash; initial speed of greater than 40 miles an hour; and external vehicle deformity. Since adoption, these mechanisms of injury are no longer employed by the Maryland protocols as indicators of severe injury.

**Mode of Transport Protocols**

A second and substantive change in protocols adopted by the EMS Board in July 2008, involved “mode of transport” decisions made in the field and specifically provided that patients within a 30-minute drive time of the closest appropriate trauma/specialty center shall go by ground in almost all instances. According to testimony received by the workgroup, the protocol adoption was the latest in a series of actions by MIEMSS to address potential over utilization of Medevac helicopters.

While there are no nationally accepted standards for making ‘mode of transport’ decisions in the field, there are consensus guidelines that identify the clinical and operational circumstances under which medical helicopter dispatch is appropriate. Maryland generally employs these national transport guidelines. Maryland’s EMS System has relied on helicopter transport provided by the MSPAC since its inception in the early 1970s.

According to the recent Expert Panel Review of Helicopter Utilization and Protocols in Maryland (discussed later in this report), “[t]he favorable impact of air medical transport on trauma mortality is demonstrated in a wide variety of studies from around the world. The overall picture of the data is consistent with a reduction in mortality of between 1 and 10 patients per 100 transports.”

**Appendix 2** is the Trauma Decision Tree developed by MIEMSS and used by field providers to classify patients and determine mode of transport.

**Protocol Implementation/Field Provider Training**

Typically, updates to the Maryland triage protocols become effective in July of each year. Prior to the release of the annual protocol updates, or an emergency protocol update, all field providers must receive training regarding the new procedures. In the past, field provider training was the responsibility of each local jurisdiction. Recently though, MIEMSS has employed web-based training videos so that the information provided on new field procedures is uniform across the State. While training is mandatory for all providers, there is no examination requirement attached to annual or emergent protocol updates. Rather, field providers’ knowledge of triage procedures is tested upon re-licensure or re-certification which occurs every two years for paramedics and every three years for Emergency Medical Technicians (EMT). Testimony
provided to the workgroup by first responders indicates that MIEMSS should consider some means of confirmation that information contained in the training videos has been conveyed successfully to field providers.

**Field Data Collection**

MIEMSS collects data regarding every scene response by emergency medical providers across the State. This data is used to inform policy and procedures employed within the EMS System. The Electronic Maryland Ambulance Information System (E-MAIS) is a web-based software application that was designed to replace the ambulance/Medevac helicopter runsheet manually filled out and submitted by pre-hospital providers to MIEMSS after every ambulance/helicopter transport. E-MAIS is operational in 24 jurisdictions ( Allegany, Calvert, Caroline, Carroll, Cecil, Charles, Dorchester, Frederick, Garrett, Harford, Kent, Prince George’s, Queen Anne’s, St. Mary’s, Somerset, Talbot, Washington, and Wicomico counties; Baltimore City, Annapolis, Aberdeen Proving Ground, Baltimore-Washington International Thurgood Marshall Airport, Martin State Airport, and MSPAC). Prior to the development and implementation of E-MAIS, commercial, paid, and volunteer EMS providers filled out more than 750,000 paper forms each year. E-MAIS is more cost-effective and improves the quality of pre-hospital care data, as well as significantly reducing the amount of time between the occurrence of an EMS call and receipt of documentation of the call. Despite the improvement, E-MAIS is not as useful as it could be in providing reports to MIEMSS and the local jurisdictions that could help analyze performance. Most useful would be a system that would afford flexibility in aggregating and analyzing data according to the needs of each user. MIEMSS plans to issue a request for proposal (RFP) later this spring for an upgrade to E-MAIS, but the upgrade is dependent on availability of funds.

**Protocol Change Following September 2008 Accident**

On September 27, 2008, a MSPAC helicopter (Trooper 2) carrying two women from the scene of a traffic accident in Waldorf crashed in Prince George’s County, severely injuring one patient and killing the other along with three helicopter crew members. It was the first fatal MSPAC accident in over 20 years. Following the crash, questions arose regarding the appropriateness of the call for helicopter transport for the patients based on the presentation of injuries at the scene. While the cause of the crash is still under investigation by the National Transportation Safety Board (NTSB), an internal review of the pre-hospital response to the automobile crash that precipitated the helicopter crash revealed that the patients were properly classified as Category C patients on the ground and were properly routed to helicopter transport based on the estimated travel time to the nearest trauma hospital.

Prior to the crash of Trooper 2, MIEMSS was engaged in a comprehensive review of the protocols for determining when a patient should be transported by Medevac helicopter. The review included an internal review of data from within the State and an external review of protocols and processes used in other states. However, as a direct result of the crash, effective
October 9, 2008, MIEMSS changed the protocol for helicopter transport of Category C and D patients to require consultation with the receiving trauma center before requesting helicopter transport. Previously, this decision was made in most instances solely in the field based on an injury assessment and drive time to the nearest trauma hospital.

In the months following the protocol change, there has been a marked reduction in helicopter scene transport. Trending forward MIEMSS estimates that it could see a 40% drop in Medevac flights between fiscal 2008 and 2009. However, the reduction has not been conclusively traced to the protocol change and, in fact, could be more directly attributable to fewer calls for helicopter transport from field providers. Even before this precipitous change, the number of Medevac flights flown annually had been steadily declining. According to testimony received by the workgroup, MIEMSS believes that a meaningful analysis of the data requires several more months of data collection to take into account seasonal spikes in Medevac missions and other variables.

Exhibit 1 shows Medevac transports between fiscal 2000 and 2010.

Exhibit 1
Medevac Transports Before and After Protocol Change
Fiscal 2000-2010

Source: Maryland Institute for Emergency Medical Services Systems
Expert Panel Review

In addition to the protocol change for transport of Category C and D patients, on October 24, 2008, MIEMSS convened a multidisciplinary, independent panel of seven experts from around the country to meet and review Maryland’s field triage protocols related to helicopter EMS transport; review patterns of helicopter utilization for the field transport of trauma patients; and make recommendations for further review and improvement of the Maryland helicopter EMS program. The Expert Panel met in open session on November 24-25, 2008, and subsequently met in closed session for review of the materials concerning the accident, discussion, and debate.

A formal report (Expert Panel Review of Helicopter Utilization and Protocols in Maryland) was issued in February 2009 and contained a number of findings and recommendations. The report of the Expert Panel praises Maryland’s publicly funded trauma system as a “long recognized national model” that has “provided the citizens of Maryland with effective, equitable, and comprehensive access to trauma services.” In addition, the report indicates that survival outcomes for trauma patients in Maryland meet or exceed the national norm and cautions that changes made to the current system of triage should not compromise this level of performance.

Nevertheless, the report also contains a number of recommendations intended to improve the State’s EMS System. Those recommendations include:

- establishment of a task force by the EMS Board to determine the optimal number and distribution of Medevac helicopter assets based on population, geography and current location and capabilities of existing hospitals;

- accreditation of MSPAC by the Commission for Accreditation of Medical Transport Systems (CAMTS);

- compliance with Part 135 of the Federal Aviation Administration’s (FAA) Air Ambulance Operations Specifications;

- continuation of MIEMSS’ comprehensive and prospective evaluation of the recent modifications to the triage process, examining over-triage, under-triage, secondary triage, time-to-definitive-care, and patient outcomes;

- comparative analysis of the current indicators of helicopter transport on an ongoing basis;

- movement toward a system that emphasizes time-driven critical care goals;
• utilization review of pre-hospital transport to ensure compliance with established triage process and criteria; and

• enhanced oversight of helicopter utilization and compliance with published triage criteria.

Many of the recommendations of the Expert Panel are echoed by the workgroup in this report and a recommendation for monitoring MIEMSS’ overall response to the Expert Panel review is contained herewith.

**Helicopter Emergency Medical System (HEMS) Service Delivery Models**

The workgroup examined alternative service delivery models, including the current MSP multi-mission capability; commercial provision of scene transports; and a hybrid approach under which MSP would operate bases while a commercial carrier would provide leased helicopters, pilots, and maintenance.

**Maryland State Police Multi-mission Model**

One area of focus for the workgroup related to whether the current multi-mission role of MSP was the most efficient use of resources. Under current practice, MSP operates a fleet of 11 helicopters at seven bases (previously, 12 helicopters at eight bases before the September 2008 crash) that are used for accident scene transports, inter-hospital transports (IHTs), law enforcement, search and rescue, and homeland security. Effective July 2009, MSP will also absorb the mission of the Department of Natural Resources (DNR) aviation unit. The advantages of the multi-mission method of service delivery include the following:

• **Operational:** Pilots and mechanics are only required to learn to operate and service one type of helicopter. Operations, instruments, and procedures are essentially the same which improves safety and limits the amount of training necessary;

• **Logistical:** Multiple parts inventories are not needed; and

• **Interoperability:** One helicopter can be used for multiple purposes without the need to deploy additional resources. For example, a mission could accommodate a search and rescue purpose and immediately lead to a medical evacuation to a trauma center.

The disadvantage of a single helicopter is cost, as an airframe must be purchased that is large enough to accommodate all mission types. A larger helicopter is more expensive to purchase and to operate.
Alternatively, the State could choose to operate up to three different types of helicopters specific to law enforcement, medical scene transport and inter-hospital transports, and search and rescue. The purchase and operational costs of three differently sized helicopters is much lower than under the multi-mission model.

The workgroup reviewed the work of the Congressional Budget Office (CBO), which prepared an analysis in 1995 of U.S. Army Helicopter Programs at the request of the Senate Committee on Armed Services. This review examined the multi-mission requirements of the army’s helicopter fleet, which included attack, reconnaissance, support or utility, and medium lift. CBO noted that “The multiple types of aircraft in the helicopter fleet saddle the army with a significant logistics burden…An aviation unit such as an attack battalion might have three different types of helicopters that it must operate and maintain, which complicates the repair skills and spare parts that each battalion must maintain.”

To address these logistical problems, the army adopted an Aviation Restructuring Initiative in 1993. This initiative was designed to equip each unit with only one type of helicopter, and thus reduce the logistics burden imposed by the need to maintain more than one helicopter.

**Multi-mission Model – Evaluation**

- **Safety:** MSP plans to request funding for safety and maintenance upgrades to improve operations including additional co-pilots, paramedics, and equipment to ensure compliance with CAMTS and FAA Part 135 regulations. MSP flew nearly 90,000 hours without a reportable NTSB accident prior to September 2008.

- **Cost:** The fiscal 2010 MSPAC budget totals approximately $24 million, $19 million of which is in special funds from the MEMSOF.

- **Coverage:** Geographic coverage of the entire State is provided for scene transport, law enforcement, and other missions. MSP provides most scene transports and a limited number of IHTs that largely focus on neo-natal and continuation of mission transports.

**Privatized Service Delivery Model**

Under commercial provision, all HEMS scene transport and IHTs would be provided by the private sector using private sector assets including helicopters, pilots, maintenance personnel, flight paramedics, and bases. MSP would continue to require six smaller helicopters at four bases to provide statewide law enforcement services.
Privatized Service Delivery Model – Evaluation

**Safety:** Commercial carriers are required to comply with FAA Part 135 regulations currently. Of concern is the NTSB finding that over 200 EMS helicopter crashes occurred over the last 20 years, with most service provided commercially. Smaller helicopters used by commercial carriers for scene transport are flown by one pilot.

**Cost:** Citizens would bear the full cost of Medevac operations through direct billing (offset by insurance reimbursement), although savings could be realized by reducing motor vehicle registration surcharges currently directed to MSPAC. Ongoing MSPAC costs would approximate $15 million to operate four bases and six helicopters for law enforcement purposes.

**Coverage:** Fewer flights occur in more rural areas of Maryland, which may not be commercially profitable. Coverage is likely to be targeted in high density areas. MSPAC may be required to continue to provide scene transports in rural areas. Scene only commercial aircraft will be smaller than current MSPAC helicopters and will have a slower response time. Basing MSPAC helicopters in only four regions also reduces response times based on the amount of area to be covered in responding to a call for service.

Hybrid Commercial Lease Model

The workgroup heard testimony for an operating model under which the MSPAC would continue to provide operating bases from which a commercial provider would supply leased helicopters, pilots, and mechanics.

Hybrid Commercial Lease Model – Evaluation

**Safety:** Commercial carriers currently comply with more restrictive FAA Part 135 regulations. However, commercial operations only use one pilot.

**Cost:** Using data from a 2006 Maryland Health Care Commission (MHCC) study, a consultant estimated commercial billings at $8,000 per flight in 2008 dollars. The actual amount paid by the State is unknown until a contract is negotiated. Federal law likely prohibits the State from preventing a commercial carrier from balance billing patients. Added MSPAC costs would be $15 million to operate six helicopters at four bases. In lieu of one larger airframe, it was also suggested that MSPAC could purchase less costly helicopters specific to law enforcement purposes and a second helicopter for search- and rescue-related purposes.
• **Coverage:** If the number of HEMS missions were to remain below 2,500, this proposal would include service at five bases using EC 135 helicopters designed for scene transports. Coverage in rural areas may not be commercially profitable and is likely to be targeted in high density areas. Scene-only commercial aircraft will be smaller than current MSP helicopters and will have a slower response time. MSP may be required to provide scene transport in rural areas.

**Public Testimony**

The workgroup held a public hearing on February 16, 2009. The hearing provided members of the public with the opportunity to comment on whether Maryland’s HEMS scene transport system should remain a public operation or be privatized. Air Methods testified in support of a hybrid commercial lease model. Several trauma center nurses and physicians testified in support of Maryland’s current system. The primary basis of their support was that the current system provides for uniform care and delivery of services which leads to better patient outcomes. Members of the Maryland Flight Paramedics Association also testified in support of keeping the public Medevac transport system. PHI Air Medical, a private carrier, submitted written testimony in support of the current EMS operations.

**Exhibit 2** illustrates a comparison of the estimated operating costs of the three service delivery models using cost data from the current fiscal year, and the impact of each on MEMSOF and the general fund.
### Exhibit 2

**Comparison of Medevac Service Delivery Models Based on Fiscal 2009 Data**  
($ in Millions)

<table>
<thead>
<tr>
<th></th>
<th>MSP Multi-mission</th>
<th>MSP Law Enf. Costs Only if Medevac Is Privatized</th>
<th>MSP Law Enf./Commerical Lease (3)</th>
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<td><strong>Number of Commercial Medevac Missions</strong></td>
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<table>
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<tr>
<th>15-year GO Debt + Interest @ $18.5 Million</th>
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<td>Per Helicopter (5)</td>
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<td>Annual Debt Service</td>
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<td><strong>Total Operating and Capital Cost</strong></td>
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<table>
<thead>
<tr>
<th>$ Value of Registration Fee for Aviation Div.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Savings</td>
</tr>
<tr>
<td>Adjusted Biennial Registration Fee</td>
</tr>
</tbody>
</table>

| Number of MSP Pilots Per Helicopter           | 2.0    | 2.0    | 2.0    | 2.0    | 2.0    | 2.0    |
| Number of Commercial Pilots Per Helicopter   | 1.0    | 1.0    | 1.0    | 1.0    | 1.0    | 1.0    |
CAMTS: Commission on Accreditation of Medical Transport Services  
EMT: emergency medical technicians  
GO: general obligation  
MEMSOF: Maryland Emergency Medical System Operations Fund  
MSP: Maryland State Police

Notes:

(1) Assumes compliance with Part 135 Regulations, addition of co-pilots, and 40 EMT-Bs (CAMTS compliance).

(2) This option represents a philosophical shift under which the patient would pay the full cost of Medevac transport, of which some costs may be funded by insurance companies. Flight costs vary. A 2006 Maryland Health Care Commission study estimated the cost per flight hour for commercial carriers, which a consultant has estimated in current dollars at $7,963.

(3) Commercial carrier provides eight helicopters, pilots, and mechanics. MSP funds eight operating bases and medical personnel in support of Medevac mission. MSP maintains search and rescue, law enforcement, and homeland security missions at four bases (with six helicopters).

(4) Does not include $415,000 in one-time costs to achieve Part 135 compliance.

(5) Debt costs do not include costs for a flight simulator or additional costs for tools or training.

(6) Air Methods representatives indicate that at 1,700 or 2,500 flights, scene transport service would be provided from five operating bases.

Source: Fiscal 2009 MSP Allowance Data; Maryland State Police; Dept of Legislative Services; Integrity Consulting
Department of State Police Medevac Operations

Since the early 1970s, MSP has operated a system of aircraft to provide emergency Medevac services and other flight services to the State’s citizens. While funding for Maryland’s EMS System is provided from a variety of State, local, and volunteer sources, annual State budget support for EMS is provided from the MEMSOF. Special funds from MEMSOF support Medevac and search and rescue functions, and general funds support law enforcement and homeland security functions. Currently, 80% of MSPAC’s operations are financed via MEMSOF, and the remaining 20% is financed via the State’s general fund. This ratio is based on the number of Medevac flights to non-medically related flights.

Current Helicopter Fleet

Medevac operations began in Maryland with a limited fleet of single engine Bell “Jet Ranger” helicopters. A 1986 crash involving one of these helicopters prompted a review and the recommendation to upgrade and expand the fleet. The first of MSPAC’s current fleet was purchased in 1989. The fleet consists of three models of aircraft, several of which have been modified to meet the latest models specifications. For almost 10 years, MSPAC operated with a fleet of 12 helicopters and 2 fixed winged aircraft. As a result of the 2008 helicopter accident, MSPAC now operates with 11 helicopters. The department’s rigorous maintenance schedule and the retrofits of many of the original models have contributed to a longer than expected lifespan for certain aspects of the fleet.

MSPAC to Assume Department of Natural Resources Aviation Division Missions

The fiscal 2010 budget deletes funding and related positions for DNR Aviation Division. In February 2009, DNR and MSPAC entered into a memorandum of understanding whereby MSPAC agreed to provide support services to DNR for aerial search and rescue as well as law enforcement. DNR conducted a total of 943 flights between fiscal 2004 and 2008, of which, 689, or 73%, were search and rescue, homeland security, or law-enforcement-related. During the same four-year time period, approximately 128, or 14%, of DNR’s flights comprised support missions such as wildlife surveys. DNR advised the workgroup that beginning in fiscal 2010, support missions will be conducted via a private contractor.

MSPAC Audit

An August 2008 performance audit conducted by OLA disclosed a number of issues pertaining to the efficiency and effectiveness of MSPAC’s operations. Particularly, OLA noted that MSPAC’s ability to make informed decisions about Medevac availability and maintenance was severely hampered by the lack of reliable and comprehensive data systems needed to manage, track, and assess critical aspects of its operations. The audit also highlighted MSPAC’s impeccable safety record.
While issues such as the replacement of the fleet and protocols used by emergency responders to request Medevac flights were excluded from the scope of the audit, issues such as the use and availability of the fleet and the effectiveness and efficiency of MSPAC’s maintenance and inspection operations were evaluated by OLA. Several of the report’s key findings are summarized below.

- **Helicopter Use and Availability:** OLA found that helicopters were used primarily for the State’s critical missions (e.g., Medevac), and other uses did not appear to impact availability. According to OLA, approximately 97% of MSPAC’s missions over the five-year period evaluated pertained to critical missions. While the audit noted that helicopter use was appropriate, OLA noted that the database used to track downtime by section was unreliable. Several of the entries tested did not agree with source documents. Additionally, downtime was not tracked by helicopter. OLA estimated that for 51 days during fiscal 2007, less than eight helicopters were in service.

- **Maintenance Operations:** While the audit noted that helicopter inspections were conducted at proper time intervals, the costs for helicopter operations were not tracked separately nor were actual labor hours spent on helicopter inspections and repairs. Additionally, no formal process existed for determining whether an outside vendor should be used for more comprehensive inspections, such as T inspections (required every 600 flight hours). Lastly, the audit indicated that available features of MSPAC’s automated inventory system were not used to ensure that critical parts were on hand to meet expected needs.

- **Personnel Staffing and Training:** According to OLA, given MSPAC’s comprehensive mission profile and current staffing, the organizational structure appeared to be reasonable. However, the audit noted that turnover in key management positions appeared to result in a lack of leadership continuity. Additionally, turnover and overtime costs for non-management staff pilots and technicians had increased over the five-year period evaluated. Low salaries and limited advancement opportunities for civilian pilots and technicians were cited as among the causes for the high turnover. Lastly, OLA noted that position vacancies have contributed to the command’s overtime expenditures.

- **Golden Hour Managing for Results:** The report noted that actual statistics measured by OLA revealed that the golden hour measure being tracked by MSPAC did not represent the commonly understood definition of the “Golden Hour,” which is the “time between the occurrence of the accident to patient delivery at a trauma center.” As such, the measure tracked by MSPAC should be revised to reflect the measure being tracked by the command “which is the time between dispatch and patient delivery to a hospital.”
Audit Update

MSPAC reports that it has taken several measures to address OLA’s audit findings. Particularly, MSPAC has created a Maintenance Quality Assurance Section to provide oversight of completed maintenance work. The section is also responsible for conducting internal audits at regular intervals. Additionally, the department has created several positions to provide additional staff oversight such as a director of maintenance, chief pilot, and director of operations position. Lastly, MSPAC reports that its maintenance software system is now being utilized to its full capabilities to track and store information pertaining to parts and employee labor costs.

Independent Review of Health Emergency Medical Services Programs

Expert Panel Reviews Maryland Medevac System

As discussed earlier in this report, following the September 2008 crash of Trooper 2, MIEMSS convened an Expert Panel to review EMS protocols and helicopter utilization. Several of the Expert Panel’s recommendations pertaining to helicopter safety are summarized below.

Regulations and Standards for HEMS Programs

HEMS regulations and standards are a combination of federal (air) and State (medical transport) requirements with additional voluntary best practice standards articulated by the CAMTS. FAA governs all of civilian aviation including public use of aircraft. HEMS regulations are governed primarily in three areas: Part 91 (General Aviation), Part 135 (Commercial Air Taxi), and Part 145 maintenance facilities. Because Maryland does not charge its patients for Medevac services, MSPAC currently operates under Part 91 of the General Aviation requirements. In general, Part 135 are more restrictive than that of Part 91 in a series of areas such as weather minimums and maintenance and documentation requirements.

As the NTSB has recommended that all HEMS patient-related flights be conducted under Part 135, the Expert Panel also recommended that MSPAC operate under Part 135 standards. The Expert Panel recognized that a recent audit of MSPAC indicated that the command had voluntarily adopted a number of Part 135 requirements.

CAMTS is dedicated to improving the quality of patient care and the safety of the transport services for rotor wing, fixed wing, and ground transportation systems. CAMTS accreditation is a program of voluntary compliance with standards that demonstrate the ability of providers to deliver service of a specific quality. In general, while a number of states require CAMTS accreditation, these standards substantially exceed minimum State licensing requirements. According to the report, 40% of the medical flight programs in the United States and Canada are accredited by CAMTS. Significant to the discussions of the Expert Panel in the review of Maryland’s HEMS were the CAMTS requirement for two medical crew providers and the incorporation of critical care into the system. While CAMTS accreditation is voluntary and
will require significant changes to MSPAC operations, the Expert Panel contends that MSPAC’s medical operations to patients will be substantially enhanced by the adoption of the self-imposed CAMTS requirements. The Expert Panel noted that MIEMSS and MSPAC have already taken steps to evaluate this option.

**National Transportation Safety Board**

NTSB issued a Special Investigation Report on emergency medical services operations in January 2006. The report involved the analysis of all EMS-related aviation accidents that occurred nationwide from January 2002 through January 2005. During that time period, there were a total of 55 accidents that occurred; 41 helicopters and 14 airplanes. These accidents killed 54 people and seriously injured 19. An NTSB analysis of the accidents indicated that 29 of the 55 accidents could have been prevented with corrective actions, including oversight, flight risk evaluations, improved dispatch procedures, and the incorporation of available technologies.

As a result of the report, NTSB issued several recommendations to FAA. The recommendations include:

- requiring all emergency medical services operators to comply with Part 135 specifications;
- requiring all EMS operators to develop and implement flight risk evaluation programs that include training all employees involved in the operation, procedures that support the systematic evaluation of flight risks, and consultation with others trained in EMS flight operations if the risks reach a predefined level;
- requiring EMS operations to use formalized dispatch and flight-following procedures that include up-to-date weather information and assistance in flight risk assessment decisions; and
- requiring EMS operators to install terrain awareness and warning systems on their aircraft and to provide adequate training to ensure that flight crews are capable of using the systems to safely conduct EMS operations.

**MSPAC Update on the Implementation of NTSB Recommendations**

MSPAC recently requested, and received approval, from the EMS Board for Part 135 certification and additional safety equipment recommended by NTSB. MSPAC reports that while the command has a flight risk evaluation matrix, it is in the process of implementing an interactive, computer-based Flight Risk Evaluation Program that all pilots will be required to complete prior to each mission. Lastly, MSPAC reports that the command already utilizes formal dispatch and flight following procedures at Systems Communication (SYSCOM). In accordance with an FAA
advisory circular, all SYSCOM duty officers were recently trained and certified as Flight Communicators.

**MSPAC Safety Enhancements**

As a safety measure, MSPAC recently requested funding from the EMS board for new equipment (e.g., night vision imaging systems, terrain awareness warning systems, and a flight simulator). Additionally, MSPAC requested funding to begin the initial hiring of Medevac co-pilots. MSPAC reports that hiring an additional pilot will substantially increase the safety of each Medevac flight. While EMS has approved MSPAC’s request for new safety equipment, the request to add an additional pilot to each flight is still under review.

**Fiscal Impact of Suggested Recommendations**

In order to achieve CAMTS accreditation, MSPAC must be Part 135 certified and operate with two medical crew members per flight. As previously mentioned, MSPAC currently operates under Part 91 of the FAA regulations and with only one medical care provider per flight. In order to achieve Part 135 certification, MSPAC estimates that it will cost a total of $415,000 in one-time costs and $645,000 in ongoing costs to achieve and maintain the certification. MSPAC recently received approval from the EMS Board to make the changes necessary to be in compliance with Part 135 and is awaiting a determination regarding CAMTS accreditation. MSPAC estimates that it would cost an additional $2.3 million to hire 40 additional paramedics. Eighty percent of the costs for Part 135 certification and CAMTS accreditation would be allocated to the MEMSOF.

MSPAC recently requested funding from the EMS Board to purchase new equipment and to hire up to 40 additional co-pilots. The total cost for these two additional enhancements is estimated to total approximately $3.6 million. Again, 80% of these costs would also be allocated to the MEMSOF.

**The Future Viability of MEMSOF**

The source of revenue for MEMSOF is an $11 annual surcharge on motor vehicle registrations. In addition to financing the medically oriented functions of MSPAC, MEMSOF provides funding for the following components of Maryland’s EMS program: MIEMSS; the R Adams Cowley Shock Trauma Center; MFRI; grants to local jurisdictions for the purchase of fire and rescue equipment and capital building improvements via the Senator William H. Amoss Fire, Rescue, and Ambulance Fund; and grants and loans to volunteer fire, rescue, and ambulance companies for the purchase, replacement, or improvement of fire fighting and rescue equipment or facilities via the Volunteer Company Assistance Fund.

Since the motor vehicle registration fee revenues are not sensitive to inflation, periodic revenue enhancements and/or alternative revenue sources are needed to keep MEMSOF viable. At the request of Delegate Dan K. Morhaim, the workgroup received an Attorney General’s
opinion regarding the legality of third-party billing should MSPAC become Part 135 certified, including whether the State could limit such billings to only insurance companies.

**HEMS Coverage**

According to the final report of the Expert Panel, there are a number of unique characteristics in Maryland’s HEMS as compared with other areas of the country, including the organization, coverage, tasking, staffing, and funding of air medical services. MSPAC’s model is unique to the country as the only statewide and state provided HEMS system.

Maryland is a relatively small State with a mixed urban and rural population. The State encompasses a very mixed geography and demographic density. Geographic considerations and rural, low population areas are important components in the need for air medical services.

**Exhibit 3** shows a list of the seven bases from which MSPAC currently operates.

According to the Expert Panel report, as evidenced by short flight time durations, Maryland has ready access to medical helicopters with a significant number of private and public carriers as back-up transport. While the Expert Panel did not make a specific recommendation regarding the number of helicopters required in Maryland, the Expert Panel noted that a variety of factors, including geography, population, and flight trends should be considered when selecting the number of helicopters for EMS in Maryland.

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### Exhibit 3
**List and Locations of State Police Helicopter Bases**

<table>
<thead>
<tr>
<th>Operating Base</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Baltimore Section</td>
<td>Baltimore County</td>
</tr>
<tr>
<td>2. Washington Section</td>
<td>Prince George’s County</td>
</tr>
<tr>
<td>3. Frederick Section</td>
<td>Frederick County</td>
</tr>
<tr>
<td>4. Salisbury Section</td>
<td>Wicomico County</td>
</tr>
<tr>
<td>5. Cumberland Section</td>
<td>Allegany County</td>
</tr>
<tr>
<td>6. Centreville Section</td>
<td>Queen Anne’s County</td>
</tr>
<tr>
<td>7. Southern Maryland Section</td>
<td>St. Mary’s County</td>
</tr>
</tbody>
</table>

Note: An eighth base, the Norwood section in Montgomery County, was operated until the helicopter accident in September 2008.

Source: Department of Legislative Services
Helicopter Base Alignment Study

A helicopter deployment study was conducted by SMART Business Advisory and Consulting, LLC, (SMART) to review the number and distribution of helicopters and bases throughout Maryland. The report, as summarized below, was released in February 2009.

The Assessment

In order to build an assessment model, SMART utilized key performance indicators that would provide a framework to compare how modifications in base numbers, locations, and helicopter quantities would affect how the State would achieve certain goals. In doing so, SMART evaluated key indicators such as geographic, population, and call density coverage across the State as well as scene transport response times.

Geographic Coverage

A key component of the assessment was the helicopter coverage radius that would provide the best opportunity to meet MSPAC’s goal of transporting a patient to the hospital within 60 minutes from the receipt of a dispatch for Medevac transport. In reviewing flight data, SMART determined that this goal has the best opportunity to be accomplished if the “response time to patient” was within 25 minutes of dispatch. As shown in Exhibit 4, when MSPAC’s response time exceeded 25 to 30 minutes, the percentage of missions that were completed within the 60 minute goal fell to 72 and 46%, respectively.

<table>
<thead>
<tr>
<th>Response Time to Patient</th>
<th>Percent of Time 60-minute Goal Is Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 15 minutes</td>
<td>96.4%</td>
</tr>
<tr>
<td>Between 15 and 20 minutes</td>
<td>94.2%</td>
</tr>
<tr>
<td>Between 20 and 25 minutes</td>
<td>92.0%</td>
</tr>
<tr>
<td>Between 25 and 30 minutes</td>
<td>72.0%</td>
</tr>
<tr>
<td>Over 30 minutes</td>
<td>46.0%</td>
</tr>
</tbody>
</table>

MSPAC: Maryland State Police Aviation Command’s

Source: Maryland State Police Aviation Command Helicopter Trooper Base Assessment February 18, 2009
Utilizing both the 25-minute response time and a projected helicopter speed of 130 knots, SMART developed multiple base coverage scenarios as shown in Exhibit 5. According to SMART, the optimal base alignment option comprises scenarios 3 and 5. As shown in Exhibit 6, under either scenario, the amount of overlap is minimized while maintaining nearly 100% of the State’s population and call density coverage.

---

**Exhibit 5**

**Geographic Coverage Options**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Number of Bases</th>
<th>Number of Helicopters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>12</td>
<td>Operate all eight sections.</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>11</td>
<td>Operate all eight sections and remove one helicopter.</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>10</td>
<td>Discontinue Norwood section.</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>9</td>
<td>Discontinue Washington and Norwood sections.</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>9</td>
<td>Discontinue Washington and Norwood sections and move the location of Southern Maryland section.</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>7</td>
<td>Discontinue Washington, Cumberland, and Norwood sections.</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>6</td>
<td>Discontinue Washington, Cumberland, Norwood, and Salisbury sections.</td>
</tr>
</tbody>
</table>

Source: *Maryland State Police Aviation Command Helicopter Trooper Base Assessment* February 18, 2009
Exhibit 6
Key Performance Indicators

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Geographic Coverage</th>
<th>Population Covered</th>
<th>Call Density Coverage</th>
<th>Response Time to a Hospital (within 60 Minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single</td>
<td>Double Overlap</td>
<td>Triple Overlap</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>97.7%</td>
<td>48.1%</td>
<td>8.8%</td>
<td>99.1%</td>
</tr>
<tr>
<td>2</td>
<td>97.7%</td>
<td>48.1%</td>
<td>8.8%</td>
<td>99.1%</td>
</tr>
<tr>
<td>3</td>
<td>97.7%</td>
<td>37.5%</td>
<td>1.5%</td>
<td>99.1%</td>
</tr>
<tr>
<td>4</td>
<td>94.8%</td>
<td>17.1%</td>
<td>0.0%</td>
<td>91.6%</td>
</tr>
<tr>
<td>5</td>
<td>97.5%</td>
<td>17.1%</td>
<td>0.2%</td>
<td>98.4%</td>
</tr>
<tr>
<td>6</td>
<td>86.0%</td>
<td>17.1%</td>
<td>0.0%</td>
<td>88.5%</td>
</tr>
<tr>
<td>7</td>
<td>72.5%</td>
<td>15.8%</td>
<td>0.0%</td>
<td>80.5%</td>
</tr>
</tbody>
</table>

Source: Maryland State Police Aviation Command Helicopter Trooper Base Assessment February 18, 2009

It should be noted that the SMART report’s analysis of geographic coverage does not take into account the amount of time that elapses from the time an accident occurs until the time that MSPAC is dispatched from SYSCOM. This factor is important since the true measure of the “golden hour” is the hour between injury and delivery of a patient to a trauma center. If the amount of time that elapses from the time an accident occurs until dispatch of MSPAC were to be taken into account, the geographic coverage radius would be diminished, thereby reducing the amount of overlap present in the SMART analysis.

Strategic Plan for Helicopter Replacement

Exhibit 7 shows when each model was purchased and, where appropriate, when the model was upgraded to new standards. The life expectancy of the airframes was not certain when originally purchased; therefore, beginning in the late 1990s, a number of studies were requested to address the cost, timing, and financing for replacing the fleet. The latest study prepared by MSPAC was submitted to the legislature on June 1, 2006.
Exhibit 7
Medevac Helicopter Models

<table>
<thead>
<tr>
<th>Year Purchased</th>
<th>Model</th>
<th>Retrofit Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>N-1*</td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>N-1</td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>N-1</td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>N-1M</td>
<td>February 2003</td>
</tr>
<tr>
<td>1989</td>
<td>N-1M</td>
<td>November 2000</td>
</tr>
<tr>
<td>1989</td>
<td>N-1M</td>
<td>October 2002</td>
</tr>
<tr>
<td>1990</td>
<td>N-1M</td>
<td>June 2001</td>
</tr>
<tr>
<td>1990</td>
<td>N-1M</td>
<td>May 2002</td>
</tr>
<tr>
<td>1990</td>
<td>N-1M</td>
<td>November 2001</td>
</tr>
<tr>
<td>1994</td>
<td>N-2</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>N-2</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>N-3</td>
<td></td>
</tr>
</tbody>
</table>

*Helicopter is no longer in use due to accident.

Source: Maryland State Police

The fiscal 2006 capital budget directed MSP and other EMS-related entities to prepare a report on helicopter replacement. Due to delays, the fiscal 2007 budget also requested a report on the schedule of replacement and a financing plan. The report recommended replacing all 12 helicopters, maximizing trade-in value by beginning replacement in fiscal 2009. After a 20-year service life, trade-in values drop. Having one airframe also reduces hours for training pilots and mechanics, can circumvent maintenance overlap problems, and reduce the need for multiple parts, and safer operations due to standardized emergency procedures.

Helicopter Financing

The General Assembly and the Governor provided funding to replace the existing fleet in the 2007 special legislative session. Chapter 6 of the 2007 special session provided that a portion ($110 million) of the revenues from the increased sales and use tax in fiscal 2008 be directed to the State Police Helicopter Replacement Fund (SPHRF). Chapter 6 also expressed the intent of the General Assembly that the Governor include sufficient expenditures from the fund to purchase three helicopters per year from fiscal 2009 to 2012. However, the Spending Mandate and Revenue Dedication Relief Act of 2008 (Chapter 414 of 2008) modified Chapter 6 to dedicate $50 million, rather than $110 million, to the SPHRF. To replace this funding,
Chapter 414 also required the Governor to include a total of $70 million for the purchase of Medevac helicopters in the fiscal 2010, 2011, and 2012 State budgets. These funds may be from any budgetary fund that receives sales and use tax, and appropriations may be reduced by the amount of capital debt that may be authorized for helicopters or by any contribution, transfer, or financing acquired from the Maryland Automobile Insurance Fund as authorized by Act of the General Assembly.

The General Assembly’s desire to replace the fleet was further evidenced during the 2008 legislative session when the legislature approved funding to procure the first installment of three Medevac helicopters. However, due to budget constraints, the Budget Reconciliation and Financing Act of 2009 authorizes the transfer of this funding to the general fund. In lieu of these funds, the fiscal 2010 Capital Improvement Program (CIP) includes $40.0 million in general obligation (GO) bonds for the purchase of two Medevac helicopters. The Administration’s plan calls for the purchase of eight helicopters to replace MSPAC’s aging fleet between fiscal 2010 and 2014. However, this plan was developed in the absence of any additional information on the effect that the basing study would have on the total number of helicopters to purchase. It should be noted that the use of GO bonds is consistent with the recommendation of a joint legislative committee formed in 2003. Chapter 385 of 2003 created the Joint Legislative Committee to Study and Make Recommendations about the Structure and Funding of the State’s Emergency Medical Response System. The committee consisted of four members of the Senate of Maryland, appointed by the President, and four members of the House of Delegates, appointed by the Speaker of the House. The final report of the committee was issued in January 2005 and recommends “the use of GO bonds to finance the replacement of the helicopters.”

**Request for Proposals**

A RFP for helicopter acquisition was issued on January 30, 2009. Prior to issuing the RFP, the Administration considered a Service Life Extension Program (SLEP) overhaul of the existing Dauphin helicopters. However, the Administration determined that the SLEP Program was not cost effective, particularly since the State would continue to operate airframes that exceed 20 years of use. According to the Maryland Department of Transportation (MDOT), the department leading the procurement effort, the RFP response deadline has been extended until mid-April 2009. The current RFP provides for the purchase of up to 12 helicopters and addresses safety needs for additional equipment (e.g., terrain awareness and night vision imaging) and items such as a flight simulator.

It is anticipated that four major manufacturers (e.g., Sikorsky, Bell, AgustaWestland, and Eurocopter) are likely to submit proposals. MDOT recently advised the workgroup that an amended RFP will include the option to lease/purchase the helicopters.
RFP Issues

The continuation of scene transport by Medevac helicopter requires policymakers to examine several decision points, many of which are articulated above. In addition to the aforementioned, the following RFP concerns should also be noted:

• **The Replacement Time Frame Is Critical:** Chapter 6 of the 2007 special session expressed the intent that the State purchases three helicopters per year over a four-year time frame to avoid purchasing more than one version of the helicopter. The legislature expressed the intent that three ships be bought per year to avoid the problems experienced with the current fleet. As shown in the CIP, the out-year plan would include the purchase of eight helicopters over a six-year period. This is potentially problematic if the selected manufacturer produces more than one version during the procurement period.

• **The Helicopter Base Alignment Study Requires Modification:** As previously mentioned, the SMART analysis does not take into account the amount of time that elapses from the time an accident occurs until the time that MSPAC is dispatched from SYSCOM. This data must be factored into the analysis in order to truly assess the amount of system overlap and geographic coverage across the State. Additionally, the study does not account for MSPAC’s assumption of DNR missions, including how the additional missions would impact the use and availability of the helicopters.

• **Helicopter Maintenance Must Be Addressed in the Future:** In light of OLA’s 2008 audit findings, the workgroup was particularly interested in ongoing helicopter maintenance and to what extent helicopter maintenance was a component of the current RFP. The workgroup has been advised by MDOT that helicopter maintenance will be considered through a separate RFP once the helicopter manufacturer has been selected for reasons that include the following: (1) the maintenance decision is an operations decision that is based on criteria other than the purchase of the helicopter and is likely to include consideration as to whether maintenance should be conducted in-house versus outsourcing, or perhaps some combination thereof; and (2) whether maintenance should be done internally or externally has not been fully vetted by all of the relevant parties in an effort to determine what impact either alternative would have on the operations of MSPAC. The workgroup has been advised that helicopter maintenance options could include a variety of alternatives ranging from a simple exchange of defective parts to a comprehensive repair and maintenance plan with a guaranteed turnaround time.
Recommendations

The workgroup concluded its work on March 9, 2009, and adopted the following recommendations:

EMS System Governance and Protocols

MIEMSS Governance

The Governor should move to fill expired terms on the EMS Board. Members appointed to the EMS Board should have the required experience to represent the specific career fields required under statute. Each board member must be a highly qualified professional and must be motivated to hold the executive director accountable for the operation of MIEMSS. Due diligence must be performed by the board in its nomination and appointment of a qualified executive director.

Protocol Changes/Expert Panel Recommendations

MIEMSS should respond to the findings of the Expert Panel regarding triage protocols and helicopter utilization. Its response should include an analysis of national perspectives on best practices. MIEMSS should report its efforts to the Legislative Joint EMS Oversight Committee recommended below.

MIEMSS Budget

In its review of the fiscal 2011 budget allowance of MIEMSS, the workgroup requests the Department of Legislative Services (DLS) to review and make recommendations to House and Senate budget committees regarding:

- the number of State vehicles provided to MIEMSS employees and whether the allocation is necessary; and
- the number of media/public relations positions within MIEMSS and whether those positions are necessary and serve the best interests of the system.

Trauma Hospital System

MHCC, in cooperation with MIEMSS, should review and evaluate the network of trauma and specialty referral centers and develop recommendations to improve the current configuration. Specifically, the report should include recommendations regarding the possible addition of new trauma centers and/or consolidation of existing trauma centers where overlapping services exist.
Helicopter Emergency Medical Service Delivery

Maryland State Police Multi-mission Capability

The workgroup endorses the continued multi-mission capability of the Maryland State Police. Use of one helicopter mirrors the trend in the U.S. military to address the logistical problems caused by having multiple types of helicopters to be operated and maintained. Moreover, a single helicopter that can accomplish multiple types of missions, such as when a search and rescue mission then requires a medical evacuation, makes the most efficient use of taxpayer resources.

Emergent Scene Transport Backup

MSP should continue to coordinate with U.S. Park Police, other states, and commercial carriers to provide backup scene transport when necessary.

Inter-hospital Transports

The workgroup finds that the commercial provision of IHTs continues to be appropriate, although MSP should continue to provide neo-natal IHTs given its unique ability to provide this service.

Maryland State Police Medevac Helicopters and Bases

Helicopter Procurement

The workgroup supports purchase of multi-mission helicopters by MSP due to the efficiencies this creates. Further the workgroup supports the DLS recommendation and previous legislative recommendation that the State purchase three helicopters annually beginning in fiscal 2010, until fleet replacement is complete based on final recommendations for the number of bases and helicopters to be operated.

Safety Improvements

MSPAC should immediately pursue CFR Part 135 certification and obtain safety equipment including (1) night vision capability; (2) Emergency Locator Transmitters; (3) Terrain Awareness Warning Systems; and (4) a flight simulator for training. MSP testified that the purchase and use of a flight simulator would save nearly $700,000 annually; therefore, the workgroup recommends that the purchase of these immediate safety upgrades be funded through the savings obtained through simulator training versus in-air training.
MSP should also immediately implement a Flight Risk Evaluation Program to assess all risks prior to making a flight decision, including review of distance, weather conditions, day vs. night operations, and pilot qualifications, as well as formal dispatch and flight following procedures to ensure continuous monitoring and communication with EMS flight, weather updates, etc.

Recognizing the safety improvements inherent in the provision of additional trooper paramedics and co-pilots, the workgroup recommends that funding for CAMTS Accreditation and new co-pilots be phased in over a multi-year process to coincide with the delivery of new helicopters beginning in fiscal 2011 as funding permits.

**Updated Base Study**

A preliminary basing study demonstrated that a degree of mission overlap exists. While additional data is required to make a definitive decision, the workgroup finds that for future basing purposes statewide coverage can eventually be provided with a maximum of seven bases and 10 helicopters. By December 1, 2010, MIEMSS, in consultation with MSP, should provide formal recommendations on the number of bases and helicopters necessary to provide statewide EMS coverage. Recommendations should be based on data collected over a two-year period from the time of the September 2008 accident, the implementation of new triage protocols, and the impact of any changes to the existing trauma hospital network. A better measure of response time should be developed beginning at time of accident rather than at the time of field call for helicopter transport.

**Helicopter Maintenance**

By October 1, 2009, MSP should evaluate a variety of service delivery options for fleet maintenance including in-house as is currently the case and the possible outsourcing of some or all maintenance functions. MSP should also implement all OLA audit findings with respect to improving and addressing maintenance deficiencies. Irrespective of the maintenance delivery model, the State’s Medevac system should utilize state-of-the-art maintenance software and inventory/parts management procedures.

**Establish a Legislative Joint EMS Oversight Committee**

Issues related to the emergency medical system in the State of Maryland are wide ranging and complex. The workgroup recommends the formation of a Legislative Joint EMS Oversight Committee to continue to monitor and provide input regarding helicopter fleet replacement and implementation of safety upgrades and reforms in response to the September crash of Trooper 2 and the 2008 MSP Maintenance Audit. This committee should be in effect during the term of the helicopter procurement. The joint oversight committee should be charged with the following:
System Governance and Protocols

• review annual protocol changes for EMS field providers and ensure that training and examination requirements are adequate;

• review efforts by MIEMSS to address recommendations of the Expert Panel;

• receive MHCC/MIEMSS trauma center report;

• receive a report from MIEMSS on modifications to the E-MAIS or the next generation system, particularly modifications that promote analysis of system performance; and

• receive annual report of MIEMSS.

Maryland State Police Medevac Program

• monitor the procurement helicopter procurement;

• monitor ongoing safety improvements including pursuit of CFR Part 135 compliance; CAMTS certification; equipment upgrades; addition of co-pilots; and compliance with NTSB recommendations (October 2008 and those resulting February 2009 public hearings on HEMS), flight risk evaluation, and flight following procedures;

• receive the updated base study from MIEMSS/MSP; and

• receive MSP maintenance study.

EMS Funding

• examine long-term viability of MEMSOF and develop long-term financing plan for EMS.
Org Chart – Key MIEMSS Personnel and Council Support

MIEMSS Executive Office
Robert Bass, MD, FACEP
Executive Director

Field Operations
Clay Stimp

CISM
SYSCOM, EMRC
Andy Filarski

Emergency Operations and Regional Programs
John Donovan

Region I
Vacant

Region II
Rick Meigher

Region III
Lisa Cherson

Region IV
John Barro

Region V
Marte Warner

EMS Board

EMS Medical Director & EMS Aeromedical Director
Richard Alcorta, MD
Doug Pizzolato, MD

Governor

EMS Board

SEMSAC

Ombudsman
Phil Hurlock

Chief Admin Officer & Personnel Director
Robert Dubansky

Finance
Sherry Alban

Programs & Gov't Affairs
Pac Garner

Media/PIO
Jim Brown

EMS-C
Cyndy Wright Johnson

EMS Medical Director & EMS Aeromedical Director
Richard Alcorta, MD
Doug Pizzolato, MD

AAG's
Mary Magee

Health Facilities and Special Programs
Mary Beachley

PAC

SOCALR
Rene Fecheer

Appendix 1
# Maryland Medical Protocols

## Trauma Decision Tree

### Category A
- GCS less than or equal to 8 or Systolic BP less than 90 (Adult) less than 60 (Peds) or Respiratory rate less than 10 or greater than 29
- Flail chest
- Rapidly declining GCS
- 2 or more proximal long-bone fractures

*When in doubt, take patient to an appropriate Trauma Center*  
Measure vital signs and level of consciousness and assess for major injury

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport to Trauma Center or Specialty Center per protocol; alert trauma team; consider helicopter transport if quicker and of clinical benefit (refer to II GPC 1).</td>
<td>Assess for other injuries.</td>
</tr>
</tbody>
</table>

### Category B
- GCS 9 - 14
- Paralysis or vascular compromise of limb
- Amputation proximal to wrist or ankle

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport to Trauma Center or Specialty Center per protocol; alert trauma team; consider helicopter transport if quicker and of clinical benefit (refer to II GPC 1).</td>
<td>Evaluate for evidence of mechanism of injury and high-energy impact.</td>
</tr>
</tbody>
</table>

### Category C
- High-risk auto crash
  - Intrusion greater than 12 in. occupant site; greater than 18 in. any site
  - Ejection (partial or complete) from vehicle
  - Death in same passenger compartment
  - Vehicle telemetry data consistent with high risk of injury
- Falls greater than 3 times patient’s height

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport to trauma center; alert trauma team. Patients within a 30-minute drive time of the closest appropriate trauma/specialty center shall go by ground unless there are extenuating circumstances. Receiving Trauma Center Medical Consultation required when considering whether helicopter transport is of clinical benefit (refer to II GPC 1).</td>
<td>Evaluate for other considerations.</td>
</tr>
</tbody>
</table>

### Category D
- Age less than 5 or greater than 55
- Patient with bleeding disorder or patient on anticoagulants
- Dialysis patient
- Burns without trauma mechanism go to burn center
- Pregnancy greater than 20 weeks
- EMS provider judgment

Consider medical direction and transport to trauma center. Patients within a 30-minute drive time of the closest appropriate trauma/specialty center shall go by ground unless there are extenuating circumstances. Receiving Trauma Center Medical Consultation required when considering whether helicopter transport is of clinical benefit (refer to II GPC 1).