Appendix I

Fire Department

Table of Contents

1	**Fire Department**	**1**
1.1	Agency Overview	1
1.2	Agency Study Participants	1
2	**Cost/Benefit Information**	**3**
2.1	Annual Agency Cost	3
2.1.1	Annual Operational Costs	4
2.1.2	Annual Resources (GIS Staff)	4
2.1.3	Annual Enterprise Costs	5
2.2	Agency Benefit Assessment	5
2.2.1	Existing GIS Benefits	6
3	**GIS Utilization and Recommendations**	**11**
3.1	GIS Utilization Analysis	11
3.1.1	GIS Personnel	11
3.1.2	GIS Data Usage	12
3.1.3	GIS Applications Usage	14
3.1.4	GIS Database Maintenance	14
3.1.5	Assessment of Business Process with GIS	16
3.2	GIS Needs Assessment	16
3.2.1	Applications	16
3.2.2	Data	17
3.2.3	Training	18
3.2.4	Best Practices	19
3.2.5	Communication and Agency Coordination	19
3.3	Recommendations	20
3.3.1	Short-term Recommendations & Potential Benefits	20
3.3.1.1	Quick Deployment	20
3.3.1.2	Additional Investment Opportunities	21
3.3.2	Mid-term Recommendations & Potential Benefits	22
4	**Programs and Activities**	**25**
4.1	Emergency Operations Center - Support	27
4.1.1	Emergency Operations Center - Support - EOC Activities	29
4.2	Emergency Response	31
4.2.1	Emergency Response - Fire Survey	34
4.2.2	Emergency Response - Rural Water Sources	36
4.2.3	Emergency Response - Redistricting Inspection Territories	38
4.2.4	Emergency Response - Analysis of the Distribution of Emergency Incidents	39
4.2.5	Emergency Response - Analysis to Support the Production of Running Assignments	41
4.2.6	Emergency Response - Workload Analysis with Spatial Component	43
4.2.7	Emergency Response - Maps for Grant Applications	45
4.2.8	Emergency Response - Districting (re) - Fire Stations and Firebox Boundaries	46
4.2.9	Emergency Response – Railroad Crossing Dataset	48
4.2.10	Emergency Response - New Street Notices and New Development Monitoring	50
4.2.11	Emergency Response - Produce Map Books for Emergency Apparatus	52
4.2.12	Emergency Response - Produce Wall Maps for EOC, Stations, and Special Projects	54
4.2.13	Emergency Response - Support Special Units HazMat and ATR	56
5	**Short-form Online Questionnaires**	**59**

Tables

Table 1 - Short Form Respondents 2
Table 2 – Interviewees 2
Table 3 – Annual Agency Cost and Benefit Summary 3
Table 4 - GIS Training Costs 4
Table 5 - GIS Supply Costs 4
Table 6 – Annual GIS Personnel Costs 5
Table 7 – Annual Enterprise GIS Costs 5
Table 8 - Existing GIS Benefits by Program 6
Table 9 – Total Annual GIS Benefits 7
Table 10 - GIS Training 11
Table 11 - Data Usage 14
Table 12 - Agency Data Maintenance 15
Table 13 - GIS Integration with Business Processes, by Program 16
Table 14 - Datasets That Need to be Created 17
Table 15 - Datasets that Need Enhancement 18
Table 16 - Datasets That Need Spatial Representation 18

Figures

Figure 1 – Fire Department GIS Benefits 8

1 Fire Department

1.1 Agency Overview

The Baltimore County Fire Department provides fire protection, emergency medical aid, and emergency rescue to the county's 754,000 citizens. The department includes more than 1,000 paid trained emergency response personnel housed at 25 career fire stations and 2,000 active volunteer personnel in 33 fire companies in the County. The career responders work at fire and rescue scenes alongside volunteer firefighters. Baltimore County firefighters and emergency medical technicians respond to about 110,000 calls each year. The Baltimore County Fire Department supports its emergency operations with an extensive network of services including:

- Fire code enforcement
- Fire investigation
- Community safety education
- Public information services
- Breathing apparatus maintenance
- Information technology
- Fire dispatch
- Recruitment
- Supply/equipment maintenance

The following Fire Department programs are covered by this study:

- Emergency Operations Center – Support
- Emergency Response

1.2 Agency Study Participants

Agency personnel contributed to the study by completing the short form online survey, participating in interviews, and providing miscellaneous data to support information provided throughout the report.

Nine people completed the online short form survey, which was used to determine each person's role within the department and determine if these individuals were using GIS to support their activities. Each of the short form responses has been included in the appendix of this document. The following personnel completed the online short form survey:

Short Form Respondents
Bruce Kesting
George Dulina, Jr.
Gregory Harrer
Irene Debye
James Korn
James Webster

Short Form Respondents
Mark F. Hubbard
Richard Petry
William Martz

Table 1 - Short Form Respondents

Eleven individuals participated in interviews conducted over several weeks in November 2006. These individuals are:

Interviewees
George Dulina, Jr.
Gregory Harrer
Irene Debye
James Korn
James Webster
Mark Demski
Mark F. Hubbard
Richard Petry
Rick Deflavis
Vernon Adamson
William Martz

Table 2 – Interviewees

2 Cost/Benefit Information

This section outlines the annual costs and benefits that are associated with GIS use and maintenance within the Fire Department. The total benefits and costs have been summarized in the table below, which are discussed in further detail in the remainder of this section.

Summary – Total Annual GIS Benefits	
Time Benefits:	**$159,463.16**
Other Benefits:	$0
Total Annual Benefits:	**$159,463.16**
Summary - Total Annual GIS Costs	
Total Annual Costs:	**$52,003.48**
Summary - Total GIS Cost/Benefit	
Total GIS Cost/Benefit:	**+ $107,459.68**

Table 3 – Annual Agency Cost and Benefit Summary

This table only includes benefits that are associated with capital returns and does not consist of other benefits such as more accurate information, faster response times, etc. A detailed review of all qualitative benefits realized by GIS users will be documented and analyzed in the Enterprise volume of the report.

2.1 Annual Agency Cost

The Fire Department contributes a moderate amount to the cost of supporting the Enterprise GIS for Baltimore County. This agency maintains several enterprise GIS datasets, holds few related operational costs, and carries less than one fulltime employee equivalent. The total annual agency cost to support all of these elements is $52,003.48

Total Agency GIS Cost: $52,003.48

Details of each of the cost issues are discussed in the sections below.

2.1.1 Annual Operational Costs

There are two types of operational costs associated with supporting GIS activities in the agency: training costs and supply costs.

The Fire Department assists the education of personnel within the agency by offering external training and attendance at local GIS conferences. These costs are outlined in the table below:

Type of Training	Estimated Cost	# of Staff Attending	Total Annual Cost
TUGIS Conference	$200	2	$400
ESRI-MUG Conference	$500.00	1	$500
Towson University Training	$1,200	2	$2,400
Total Training Costs			**$3,300.00**

Table 4 - GIS Training Costs

The following costs represent the Fire Department GIS supply costs related to the use of GIS in the agency:

Supplies Items	Annual Costs
Plotter Paper	$360
Print Cartridges (Plotter)	$310
Print Cartridges (Medium Printer)	$320
Print Cartridges (Small Color Printer)	$120
Total Supply Costs	**$1,110.00**

Table 5 - GIS Supply Costs

2.1.2 Annual Resources (GIS Staff)

The agency contains three staff members that perform some activity supporting GIS for the agency. This assistance includes GIS database development efforts, as well as GIS application installation, configuration, and support. $32,300 is spent annually to support the personnel associated with GIS maintenance activities (these data layers are listed in section 3.1.4), which is based on the salary and overhead of each GIS personnel multiplied by the percentage of time performing GIS maintenance activities. These individuals are listed in the table below, along with the percentage of time allocated to GIS maintenance activities. This percentage does not represent time spent using GIS technology, but rather database development and maintenance that supports GIS activities.

GIS Personnel	% Allocated to GIS Maintenance Activities
Gregory Harrer	5%
James Webster	35%
Irene Debye	85%
Total GIS Personnel Cost:	**$32,300**

Table 6 – Annual GIS Personnel Costs

2.1.3 Annual Enterprise Costs

Each of the costs for providing the enterprise GIS has been totaled for the County and distributed among each of the county agencies relative to the number of users in each agency. These costs have been categorized as operating costs, or the costs that are expended to provide GIS support and resources (such as database management, infrastructure, software licensing etc.), and capital costs, which reflect the cost of purchasing GIS data (such as Orthophotography or Contours). The total annual operating cost for the County GIS enterprise is $859,717.21 and the total annual capital cost is $272,000.00. The Fire Department has a relatively low number of GIS users - three (or 1.35% of the total users in the County). Although all field personnel use paper maps which are products of the GIS, the annual enterprise costs have been proportionately distributed to the Fire Department based on this 1.35% factor. These costs are calculated as $11,617.80 in operating costs and $3,675.68 in capital costs, totaling $15,293.48. Each of these figures has been provided in the table below.

# of Users	% of Total Users	Factor of Operating Cost Applied to Agency	Factor of Capital Cost Applied to Agency	Total Annual Enterprise Cost Applied to Agency
3	1.35%	$11,617.80	$3,675.68	**$15,293.48**

Table 7 – Annual Enterprise GIS Costs

2.2 Agency Benefit Assessment

The Fire Department has seen moderate benefits from GIS usage in relation to the size of the department and in comparison to other agencies within the County of similar magnitude. GIS provides important communication tools within the agency and between public safety agencies (e.g., fire, police, and The 911 Center), although much information is still conveyed by means of hardcopy maps. GIS is also used to solve spatial problems, providing both qualitative and quantitative benefits to the agency. These are discussed in the following sections.

2.2.1 Existing GIS Benefits

The existing benefits realized by the Fire Department have been determined for each activity by analyzing the effort needed to perform a task with GIS in comparison to the time spent without GIS. This examination allows each activity to be measured in terms of time, and then recomputed to dollars being realized annually. Each of the existing benefits that is currently being realized has been summarized by program below and has been aggregated to give an annual dollar figure. These benefits are discussed in more detail in section 4. All dollar amounts are based on a flat rate of $33.95 per hour.

Program	**Emergency Operations Center (EOC) - Support**
Description	GIS is used to provide onsite GIS support and create pre-made maps for use at the EOC and to maintain and produce data and maps facilitating large-scale emergency management. Some items of importance are evacuation routes, road conditions, characteristics of population at risk, location of facilities and hospitals to be used in disasters, location of vulnerable populations at institutions, hazardous material, hurricane evacuation routes, schools, college campuses, assisted living facilities, flood plains. GIS has just recently been applied to the EOC operations. It is used to provide on-the-fly mapping support upon request of the EOC officers during activation.
Time Benefits (Annual)	$6,790.00 (200 hours)
Other Benefits (Annual)	None
Total Benefits	**$6,790.00**
Program	**Emergency Response**
Description	The Fire Department is responsible for maintaining a credible and effective team of experts and systems for responding to emergency incidents. A critical component of this preparedness is the development, maintenance, and analysis of geospatial data in support of all aspects of the department's activities. The FD Emergency Response program uses GIS technology for primary data gathering and display as well as for analysis and reporting. GIS technology helps support decision making processes, improving and enhancing the department's effectiveness in deploying people and apparatus to emergencies.
Time Benefits (Annual)	$152,673.16 (4,497 hours)
Other Benefits (Annual)	None
Total Benefits	**$152,673.16**

Table 8 - Existing GIS Benefits by Program

Total Annual GIS Benefits Summary			
Time Benefits Summary (By Activity):	**Hours Saved**	**Labor Rate (Avg)**	**Annual Time Benefits**
Emergency Operations Center - Support	200	$33.95	$6,790.00
Emergency Response	4,497	$33.95	$152,673.16
Total Time Benefits:	**4,697**	**$33.95**	**$159,463.16**
Other Benefits Summary (By Activity):			**Annual Other Benefits**
None			$0
Total Other Benefits:			**$0**
Grand Total Annual Benefits:			**$159,463.16**

Table 9 – Total Annual GIS Benefits

Each of the benefits for the activities listed in section 4 have been depicted in the figure below, which provides a clear picture of the areas that are receiving the most benefits from GIS usage.

Fire Department GIS Benefits

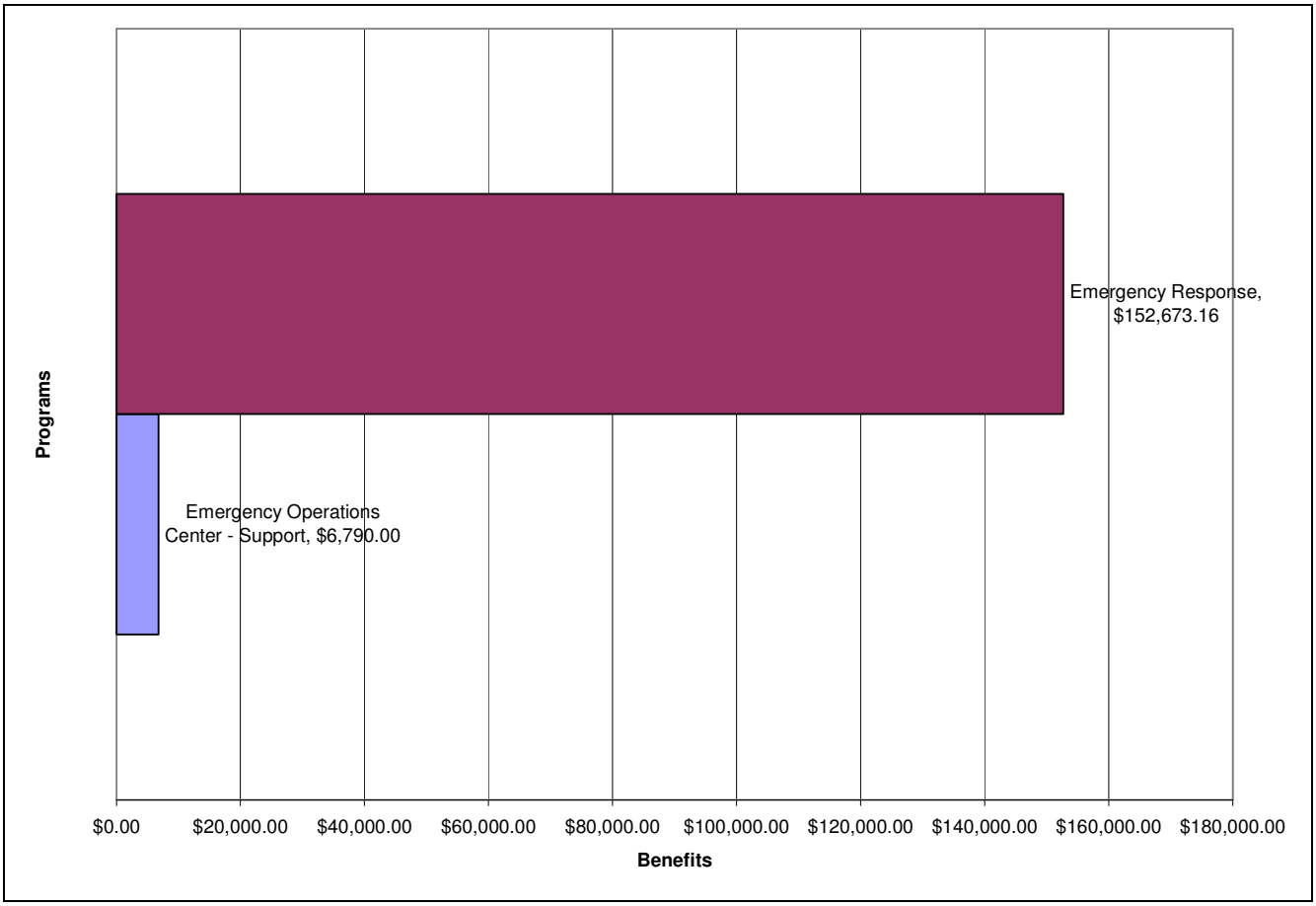

Figure 1 – Fire Department GIS Benefits

The Emergency Response program receives most of the benefits because most of the agency's activities fall under this program. Emergency Operations Center Support also receives a smaller amount of benefits through the use of GIS.

There are notable qualitative benefits realized from the use of GIS in the Fire Department; however, these cannot be quantified into a realized benefit metric to be included in the cost/benefit analysis. Some of the qualitative benefits are as follows:

- Faster response time will result in fewer damages to buildings on fire.
- Faster response time will result in saving of lives, reduction of severity of injuries, and therefore reduced health costs and health insurance costs for citizens.
- Accurate data reduces risk of injuries of first responders.
- Standardization of mapping and surveys reduces the cost of training.
- Managing resources, such as rural water resources, using GIS can reduce the home insurance costs of all citizens because of a better county "fire insurance rating."

- Better information (made possible by using GIS) allows better allocation of resources, which reduces the cost of expensive equipment.

THIS PAGE INTENTIONALLY LEFT BLANK

3 GIS Utilization and Recommendations

3.1 GIS Utilization Analysis

GIS has a moderate use within the Fire Department. There are relatively few users within the agency compared to the total number of personnel. However, the GIS users within the Fire Department appear to be relatively efficient in their current use of GIS and recognize that GIS could contribute significantly more to the agency's operations if additional resources (including staffing, hardware, and data) were available.

The Emergency Operations Center (EOC) has recently applied GIS in its business practices. GIS is used to produce data and maps that facilitate large-scale emergency management.

3.1.1 GIS Personnel

There are relatively few GIS specialists and GIS-trained personnel within the Fire Department compared to the total number of personnel within the agency. The GIS specialists provide database maintenance, GIS analysis, and map products that are used throughout the agency.

The Fire Department takes advantage of the GIS training provided by the county. Additionally, the agency provides emergency management training to other county agencies through their GIS support of the Emergency Operations Center.

The Fire Department has already invested in providing GIS training through the Computer Training Center in the Office of Information Technology for its staff. The following shows a breakdown of the levels of training and the number of staff that have received training at that level:

Basic Training (DataQuery, ArcView)	Mid-Level (ArcGIS Intro)	Advanced (ArcGIS 8x or higher)
1		6

Table 10 - GIS Training

Most of the training provided has been advanced because of the need to perform topology edits as part of the database maintenance activities performed by the Fire Department. Note that the personnel that have been trained are not necessarily using GIS at the present time. Any further investment in training should be followed through with skill reinforcement and usage of the system to ensure the skills are transferred from the classroom into the business activity performed.

GIS staffing needs within the Fire Department have expanded dramatically within the last year. The Fire Department has taken on responsibilities for editing spatial data layers and those responsibilities will increase as the Facilities Geodatabase is completed and enters the maintenance phase. There are other GIS data layers that the Fire Department spends time verifying and updating to meet its internal needs. These include data that are being converted from hand drawn maps that do not have the

accuracy required for GIS and that data must be verified before it can be added to the GIS. There are other projects and needs for GIS in the department that are currently not implemented because of low resources. Additionally, the Fire Department has recently begun providing GIS staff and support to the EOC. Current EOC staffing consists of a Management Analyst, an Engineering Assistant, and a temporary employee. The classification and job specs for Engineering Assistant and Management Analyst do not include requirements for GIS skills. A statement regarding staffing to include GIS capabilities in an employee would be beneficial. The needs for GIS skills in these positions is well beyond what is reasonable to expect from on-the-job training (e.g., performing topology edits in ArcSDE).

Use of the GIS by the Active Duty Officer (ADO) is also needed. Currently, mapping is only used by the Call Takers in the 911 center. There are many calls for service where the first due companies may not be on the call. This is particularly critical in the rural areas of the county where there are mile-long driveways with multiple properties off of them. The ADO could assist field units in finding proper locations by using GIS tool if provided.

3.1.2 GIS Data Usage

The Fire Department uses many of the GIS datasets provided by OIT's ArcSDE services via the County WAN. However, because of slow data connections to the Public Safety Building, most of the data are copied locally for daily use by the Fire Department. These datasets are used in a variety of ways. Additionally, the Fire Department uses a number of agency-specific datasets to support its activities. The datasets used by the agency's programs are listed in the table below:

GIS Data Layer	Used by # Programs
AddressPoints (View)	2
Buildings	2
Census Block Groups (2000)	2
Census Blocks (2000)	2
Census Tracts (2000)	2
Contours	2
County Boundary	2
Fire Battalion Boundary	2
Fire Boxes	2
Fire Stations	2
Freeway Boxes	2
Hydrants	2
Hydrology	2
Marine Fire Boxes	2
Mutual Aid Boundaries	2
Orthophoto (2005)	2
Railroads	2

GIS Data Layer	Used by # Programs
Reservoir	2
Roads	2
Rural Water Sources	2
Schools—Point Location	2
Street Centerlines	2
Tax Parcel	2
Trails	2
Trails (As obtained in house or from other agencies)	2
Transmission Lines	2
Athletic Fields	1
BCMD Grid	1
Bridges	1
County Facilities	1
Development Plans	1
Digital Elevation Models	1
Facilities	1
FEMA Maps	1
Fire Hydrants	1
Fire Stations Boundary	1
Flood Insurance Maps (FEMA)	1
Golf Courses	1
Health Centers	1
Index Grid - 200 Scale (BCMD)	1
Index Grid - 600 Scale	1
Index Grid - ADC Map	1
Metro Railroad	1
Orthophoto (2002)	1
Park Points	1
Police Precincts	1
Police Reporting Areas	1
Police Stations	1
Snow Plow Routes	1
Solid Waste Facilities	1
Spot Elevations	1
Storm Surge data from USACE	1
Streams and Ponds	1

GIS Data Layer	Used by # Programs
Water Plats	1
Wooded	1

Table 11 - Data Usage

3.1.3 GIS Applications Usage

The GIS personnel within the Fire Department have used the enterprise GIS applications provided by OIT as well as several additional applications. The primary application used by personnel is the ArcGIS standard toolset. ArcGIS version 9.0, service pack 3 (SP3) is the current County standard deployed throughout the various agencies. This software appears to be effectively used where incorporated and personnel are proficient with these programs. Other web-based applications used within the Fire Department include MapQuest (for drive-time estimates), and Google Earth for access to orthophotography. Additionally, in support of the EOC, Fire Department personnel use DataQuery, MyNeighborhood, Telephone Data, and the Computer Aided Management of Emergency Operations (CAMEO) software provided by the EPA and NOAA for managing chemical incidents. CAMEO includes a chemical database as well as GIS mapping capabilities and plume modeling.

3.1.4 GIS Database Maintenance

The Fire Department is responsible for maintaining the following layers in support of the enterprise GIS:

Dataset	Description	Update Frequency	Location	Complete	Activities Using Data
Fire Battalion Boundaries	Fire Battalion Boundaries are created by dissolving Station Boundaries.	As needed	SDE	Yes	• Emergency Operations Center – Support • Emergency Response
Fire Boxes	Smallest unit of area used for dispatch. Topologically dependant on Cadastral, Centerlines, and Hydrologic features layers.	As needed	SDE	Yes	• Emergency Operations Center – Support • Emergency Response

Dataset	Description	Update Frequency	Location	Complete	Activities Using Data
Fire Hydrants	Originally created from low accuracy sources, in process of updating to improve spatial accuracy. Will need to be updated again when Water Mains data layer is complete.	Weekly	Local	In progress	• Emergency Operations Center – Support • Emergency Response
Freeway Boxes	Used for dispatch to events on freeways, which have limited access. Not topologically related to Fire Boxes but to Road Centerlines.	As needed	SDE	Yes	• Emergency Operations Center – Support • Emergency Response
Marine Fire Boxes	Used for dispatch to water events.	As needed	SDE	Yes	• Emergency Operations Center – Support • Emergency Response
Mutual Aid Boundaries	Used for dispatch to an adjacent county event. Usually a specified distance from the county boundary.	As needed	SDE	Yes	• Emergency Operations Center – Support • Emergency Response
Rural Water Supplies	Point location of rural water sources, including water towers, tanks, and draft sites.	Weekly	Local	May be incomplete	• Emergency Operations Center – Support • Emergency Response
Station Boundaries	Station Boundaries are created by dissolving Fire Boxes.	As needed	SDE	Yes	• Emergency Operations Center – Support • Emergency Response
Trails	Created from various data sources for use in firebox map books	As needed	Local	Mostly incomplete, need information for Gunpowder and Patapsco Parks	• Emergency Operations Center – Support • Emergency Response

Table 12 - Agency Data Maintenance

The cost of maintaining each of these data layers is discussed in section 2.1.2.

3.1.5 Assessment of Business Process with GIS

GIS is being effectively used to support most of the business processes within the agency. GIS involvement in each of these programs' business processes is discussed in the table below.

Program	Business Process Assessment
Emergency Operations Center - Support	GIS is used in this program to: • Provide on-site GIS support at the EOC • Create pre-made maps for use in the EOC • Maintain and produce data that facilitate large-scale emergency management
Emergency Response	GIS is used in this program to: • Collect data • Create map books for use in all emergency apparatus • Support grant applications • Perform analyses of and generate reports on incidents • Perform analyses to support deploying people and apparatus to emergencies GIS analysis supports policy development and capital program recommendations.

Table 13 - GIS Integration with Business Processes, by Program

The involvement of GIS in specific activities is discussed more thoroughly in section 4. There are several ways that GIS could be used to integrate the system more fully into business processes, which are discussed in more detail in sections 3.2.4 and 3.3.

3.2 GIS Needs Assessment

3.2.1 Applications

There are several custom applications that could be developed to support the business processes of the Fire Department, which are discussed below.

- **Emergency Operations Center Application** – An application could be developed to support Emergency Operations Center activities. This application could offer tools to perform geocoding; analyze properties impacted by flooding; model various bomb blast scenarios including number of buildings impacted and debris amounts; calculate estimated debris quantities for flood, hurricane, and tornado events; and help manage post-event activities by providing tools to allow the user to note the locations of obstacles, note which roads have been cleared of debris, etc.

- **Customized Emergency Vehicle GIS Tools** – For future consideration, when GIS- and GPS-enabled computers are placed in Emergency Vehicles, customized tools akin to DataQuery but specific to emergency management could be developed to make GIS use by emergency personnel easier. Such an application would provide a standardized table of contents and map display, allow users to add additional pertinent data layers that might pertain to the incident, view the locations of other emergency vehicles, and call up scanned Fire Survey building floor plans.

3.2.2 Data

There are several datasets that could be developed to support the needs of various programs in the Fire Department. Some of these datasets are listed in the table below. These datasets may also provide value to other agencies.

Dataset	Activities That Could Benefit From Data
Water mains, including attributes specific to FD needs (e.g., water flow, water main size, hydrant status, water type, etc.)	• Emergency Response – Analysis of the Distribution of Emergency Incidents • Emergency Response – Data Analysis with Spatial Component. • Emergency Response – Produce Map Books for Emergency Apparatus • Emergency Response – Produce Wall Maps for EOC, Stations, and Special Projects
Gas Mains	• Emergency Response – Analysis of the Distribution of Emergency Incidents • Emergency Response – Data Analysis with Spatial Component. • Emergency Response – Produce Map Books for Emergency Apparatus • Emergency Response – Produce Wall Maps for EOC, Stations, and Special Projects
Storm drains	• Emergency Response – Produce Map Books for Emergency Apparatus • Emergency Response – Produce Wall Maps for EOC, Stations, and Special Projects • Emergency Response – Support Special Units HazMat and ATR
Hazardous Material Locations	• Emergency Response – Analysis of the Distribution of Emergency Incidents • Emergency Response – Data Analysis with Spatial Component. • Emergency Response – Produce Map Books for Emergency Apparatus • Emergency Response – Produce Wall Maps for EOC, Stations, and Special Projects • Emergency Response – Support Special Units HazMat and ATR
Annotation Feature Classes	• Emergency Response – Produce Wall Maps for EOC, Stations, and Special Projects
Flood Hot Zones (derived layer focusing on areas with frequent flooding)	• Emergency Operations Center Support

Table 14 - Datasets That Need to be Created

Many datasets are already being created and maintained by the GIS enterprise, but are not complete or do not contain the information needed by users within the agency. The layers below could be completed to provide benefits to the Fire Department:

Dataset	Current Data Limitation	Programs That Could Benefit From Data
Rural Water Supplies	May be incomplete and not currently maintained.	• Emergency Operations Center – Support • Emergency Response
Trails	Need additional data for Gunpowder and Patapsco Parks. Need to coordinate with DRP and the State regarding attributes and spatial accuracy requirements.	• Emergency Operations Center – Support • Emergency Response
Road Centerlines	Need more data for access roads, private drives, and to include proposed roads in a more timely manner (some roads are built before this data set is updated).	• Emergency Operations Center – Support • Emergency Response

Table 15 - Datasets that Need Enhancement

Some other datasets would benefit from a link to Address Points, giving these datasets a spatial representation. These are:

Dataset	Activities That Could Benefit From Data
Scanned Fire Surveys	• Emergency Response – Fire Survey • Emergency Response – Produce Map Books for Emergency Apparatus

Table 16 - Datasets That Need Spatial Representation

3.2.3 Training

Changes in technology have placed increased demands for the Fire Department to perform more GIS functions. The legal requirement for the Computer Aided Dispatch Center to be able to locate cell phone callers created the need for more spatially accurate firebox boundaries. These changes led to the utilization of shared spatial databases requiring topology edits which required that the Fire Department develop skills in performing topology edits in ArcSDE. This editing requires more sophisticated GIS skills than editing shapefiles or dealing with the Baltimore Metropolitan Council for the production of the geo-file did in the past.

Fire Department GIS personnel would benefit from exposure to more advanced GIS training and complex spatial analysis tools and methodology as well as training specific to emergency management.

GIS has evolved to an essential part of Emergency Management and the Fire Department is aware that there are many more possibilities for what GIS can help them accomplish in this area.

Additionally, as the agency contemplates adding GIS- and GPS-enabled computers in the Emergency Vehicles, a robust GIS training program will be needed to introduce GIS to the many new users that would have access to the tools. Customized tools, akin to DataQuery but specific to emergency management may also be needed.

3.2.4 Best Practices

The Fire Department could take advantage of best practices that have been implemented by other agencies or counties with similar business processes through the following:

- **Spatially Manage Incidents, Running Assignments, and Redistricting** – The agency could take better advantage of GIS through the use of network analysis and statistical tools to improve its ability to analyze incidents and manage its assets. This would allow better vehicle routing, easier and faster analysis of Fire Box and Station Boundaries, and more ability to see relationships, both spatial and otherwise, among incidents.

3.2.5 Communication and Agency Coordination

GIS supports communication within the Fire Department through facilitating production of the hardcopy maps used by all of the emergency response personnel in the Emergency Vehicles. In the future, this could be expanded through implementation of GIS- and GPS-enabled computers in the Emergency Vehicles.

Communication between county agencies could be improved. The constraints of the network make it difficult to transfer digital spatial information between the Fire Department and other agencies and several interviewees did not seem aware of key county datasets that could benefit the agency. Additionally, the Fire Department maintains several datasets for which other agencies have expressed a need. These include the Trails dataset that should be shared with DRP, and the BMC regional data that could be used by The 911 Center, Health, Aging, Social Services, and Corrections. The Fire Department could also benefit from improved use of GIS by PDM to receive information about new buildings and developments, proposed roads, and as-built floor plans. And, the Fire Department could benefit from additional ways to communicate with DPW regarding bridge and road closures and tracking of snow removal activities. Additionally, the DPW Building Services personnel could possibly provide the Fire Department with information on county-owned buildings needed for Fire Surveys.

3.3 Recommendations

The Fire Department could further benefit from GIS in several ways. This section outlines recommendations that can be implemented in the short-term and mid-term to enhance the agency's GIS usage and further take advantage of the enterprise system provided by the County. These will in turn reduce time and money spent on activities performed by the Fire Department and increase the level of service provided to citizens. Since the Fire Department's responsibilities mostly have spatial components, benefits can be gained in several ways from using GIS within the agency.

3.3.1 Short-term Recommendations & Potential Benefits

There are several undertakings that should be implemented in the near term to improve GIS usage within the agency and meet the needs outlined in the previous section. These recommendations are categorized by activities that can be quickly deployed with little effort and by activities requiring a greater investment that are greatly needed. Each of these recommendations is discussed below. See section 4 for more detailed recommendations to support individual activities.

3.3.1.1 Quick Deployment

The following recommendations have the potential to provide additional benefits to the agency and can be implemented with few additional resources:

Opportunity 1: Increase Network Speed

The WAN used to connect the Public Safety Building to the enterprise ArcSDE database provided by OIT is cumbersome, preventing data from being used effectively. This connection should be increased to allow for faster communication between the Fire Department and OIT. This will allow for personnel to use the data services provided by the county (instead of performing data dumps periodically), as well as more easily edit and post data that has been created within the department. This will save time spent managing data dumps, increase the accuracy of the data by providing Fire Department users up-to-date data, and improve collaboration between county agencies.

Opportunity 2: Leverage the Facilities Geodatabase

Baltimore County is developing an enterprise, countywide Facilities Geodatabase that will be accurate and maintained and have the addresses, business names, and use codes for almost all facilities in Baltimore County (commercial, industrial, etc.) This database was compiled to be spatially accurate. With this database having all address locations, as well as commercial, industrial, residential, and other facility classifications, it will provide needed information for the Fire Department. It also includes installations, such as industrial parks and other types of commonly associated structures (universities, etc.). Its use should be incorporated into the Fire Department's future business practices by using address point Geocoding and integrating information into the Reverse 911 system.

Opportunity 3: Share Regional Data

Several other county agencies, notably The 911 Center, Department of Health, Department of Corrections, and the Department of Aging, have a need for regional data that extends into Baltimore City and other adjacent jurisdictions. The Fire Department should explore the possibilities of partnering with other agencies to share the cost of licensing and maintaining data for the entire region.

Opportunity 4: Coordinate with DRP on Trails Dataset
DRP has identified a need for a GIS data layer for hiking and biking trails. The Fire Department has collected at least some of the information that might be needed by DRP. Coordination with DRP is recommended regarding the data the Fire Department has developed and what requirements DRP has regarding data accuracy and attributes to determine if the existing data could meet both agency's needs. OIT, the Fire Department, and DRP should coordinate and develop a plan for compiling a trails dataset.

3.3.1.2 Additional Investment Opportunities

Opportunity 1: Develop Enterprise Annotation Feature Classes at Commonly Used Map Scales

The Fire Department spends significant resources developing hardcopy maps of fireboxes for use in emergency vehicles and in fire stations. There are currently over 850 firebox maps. These maps are produced at varying scales (from 1:200 to almost 1:30,000), depending on the size and shape of the firebox, with the goal of displaying the data at the maximum possible size on the paper. An additional requirement is to clearly display all important features (e.g., hydrants, etc.) without labeling overprints. Having a way to store and re-use the most frequently used annotation feature classes (e.g., road names, stream names, etc.) in the SDE database as each agency develops it for their own use could reduce the time spent creating hardcopy maps. While no pre-made annotation would be 100% perfect for all uses, and other agencies may not use the same map scales, having this resource available to all agencies could save time in map production, allowing time to be spent refining annotation for specific needs. However, implementation of Opportunity 3 (Provide GIS- and GPS-Enabled Mobile Computers for EMS and Fire Vehicles) would eliminate the need for hardcopy maps and would permanently solve this problem.

Opportunity 2: Develop Hazards Geodatabase

The Fire Department has a need to identify and report on the locations of hazardous materials. Currently, the CAMEO database is used to assist with this activity, but development of a County hazards database that could include information pertinent to all public safety agencies could benefit multiple agencies. Hazardous material locations should be included as a feature class. Coordination with DEPRM regarding their needs and/or data holdings should also be included in developing this database. This project should also be coordinated with Maryland Department of the Environment's Tier II manager project that was previously initiated.

3.3.2 Mid-term Recommendations & Potential Benefits

There are several undertakings that can be implemented in the mid-term to improve GIS usage within the agency. These are summarized below. See section 4 for more detailed recommendations to support individual activities.

Opportunity 1: Provide Network Analysis and Statistical Analysis Tools

The Fire Department could better perform its GIS analysis and reporting functions through use of network analysis tools such as ESRI's Network Analyst extension. This would allow better vehicle routing, easier and faster analysis of Fire Box and Station Boundaries, etc. However, it should be noted that this would require a road centerline data layer capable of supporting routing. Although the Fire Department uses Crystal Reports to output some of its reports, it could benefit from additional statistical analysis tools.

Opportunity 2: Implement AVL for EMS and Fire Vehicles

An Automatic Vehicle Location (AVL) system is in place for Police Department vehicles and in use by The 911 Center police dispatchers. AVL helps locate resources in the field so dispatch is timelier and vehicles are easily located. This system should also be implemented for EMS and Fire vehicles. Fire dispatchers would be able to track resources and coordinate responses to emergency incidents more efficiently.

Opportunity 3: Provide GIS- and GPS-Enabled Mobile Computers for EMS and Fire Vehicles

All EMS and Fire vehicles could benefit from having GIS- and GPS-enabled computers on board. This would allow more real-time data display and significantly reduce the time spent making paper map books for use in each vehicle. Additionally, updates to data could be recorded in the field more easily and brought back for posting into the agency's data layers. Additionally, when this is implemented, customized tools akin to DataQuery but specific to emergency management should be developed to make GIS use by emergency personnel easier. Such an application would provide a standardized table of contents and map display, allowing users to add additional pertinent data layers pertaining to the incident, view the locations of other emergency vehicles, and call up scanned Fire Survey building floor plans.

Opportunity 4: Scanned Floor Plans Linked to Buildings

A recommendation that has been mentioned in the context of several agencies is scanned floor plans that would be linked to the Address Points GIS layer. This would allow viewing of the floor plans by The 911 Center operators to verify a caller's location, use by emergency and rescue workers before entering a building to more quickly locate an incident or to locate critical building utilities, and use by the DPW Building Services department for County-owned building maintenance activities. The information currently collected by the Fire Department in

its Fire Surveys (e.g., stairwell locations, connection points, hazards, etc.) should be included on the documents before scanning. Building maintenance crews could also contribute information to the documents as they perform maintenance on County-owned buildings. Opportunity 3 needs to be implemented in order to obtain the maximum benefits of this opportunity.

Opportunity 5: Develop a Customized Emergency Management Application

An application should be developed to support Emergency Operations Center activities. This application could offer tools to perform the following:

- Geocoding;
- Show the locations of flood prone areas, critical facilities, critical infrastructure, and evacuation routes;
- Locate the best sites for temporary shelters based on selected criteria;
- Model various bomb blast scenarios and provide reports and maps showing the number of buildings impacted and debris amounts generated, based on building characteristics and size of bomb;
- Calculate estimated debris quantities for flood, hurricane, and tornado events based on building characteristics and event type, location, and magnitude; and
- Help manage post-event activities by providing tools to allow the user to identify areas affected by an event, note the locations of blocked or impassable roads, track which roads have been cleared of debris, and identify areas in need of emergency water, ice, and other critical supplies.

This application could also be integrated with HAZUS and CAMEO as well as the MDE Tier II web-based application that tracks and maps business locations that store hazardous materials.

Opportunity 6: Implement a GIS-Enabled Telephone Dialing System

An automated telephone dialing system should be developed to automatically pull all of the telephone numbers associated with addresses in a user-defined geographic area and step through dialing each number. It should allow a custom message to be recorded and played as each telephone number is dialed and answered. It should record in a database the results of the alert in terms of numbers of human answerers, answering machines, failures to connect, etc. Having this data and the ability to contact the citizens of Baltimore County will save lives and property. An automatic telephone dialing system can reach the citizens faster and more reliably than the door-to-door approach. To be able to geocode the impacted areas will be an invaluable asset.

THIS PAGE INTENTIONALLY LEFT BLANK

4 Programs and Activities

Each of the interviews conducted with agency officials and personnel were used to compile information about the business processes used for each program within the agency, as well as look at how GIS is being used and benefits are being realized.

Each program is described below, listed with GIS-related funding and mandates, as well as any social or political benefits that are being seen as a result of using GIS. The associated products, customers served, and data/ applications used are also discussed. Activities have also been included under their associated programs, along with the process with and without GIS used to complete this activity, benefits that have been realized, and recommendations for additional GIS implementation where appropriate.

THIS PAGE INTENTIONALLY LEFT BLANK

4.1 Emergency Operations Center - Support

Program: Emergency Operations Center - Support
Primary Point of Contact:
Greg Harrer
Overview:
GIS is used to provide onsite GIS support and create pre-made maps for use at the EOC and to maintain and produce data and maps facilitating large-scale emergency management. Some items of importance are evacuation routes, road conditions, characteristics of population at risk, location of facilities and hospitals to be used in disasters, location of vulnerable populations at institutions, hazardous material, hurricane evacuation routes, schools, college campuses, assisted living facilities, flood plains. GIS has just recently been applied to the EOC operations. It is used to provide on-the-fly mapping support upon request of the EOC officers during an activation.
Funding:
There is no external funding for this program.
Mandates:
There are no GIS-related mandates associated with this program.
Political Benefits:
Improved operation of the EOC
Social Benefits:
This program helps save lives and property by providing maps supporting EOC operations for planning, mitigation, decision making, and response and recovery operations.
Products/Services:
• GIS staffing to the Emergency Operations Center • Various map products and readiness to assist with GIS activities if the Center is activated.
Customers:
• EOC team • Baltimore County Citizens

Data (Enterprise Layers are Listed in Bold):		
• **AddressPoints (View)** • Athletic Fields • BCMD Grid • Bridges • **Buildings** • **Census Block Groups (2000)** • **Census Blocks (2000)** • **Census Tracts (2000)** • **Contours** • County Boundary • County Facilities • Digital Elevation Models • **Facilities** • FEMA Maps • Fire Battalion Boundary • Fire Boxes	• Fire Stations • Freeway Boxes • Health Centers • Hydrants • **Hydrology** • Index Grid - 200 Scale (BCMD) • Index Grid - 600 Scale • Index Grid - ADC Map • Marine Fire Boxes • Mutual Aid Boundaries • **Orthophoto (2002)** • **Orthophoto (2005)** • Police Precincts • Police Reporting Areas • Police Stations	• Railroads • Reservoir • **Roads** • Rural Water Sources • Schools—Point Location • Snow Plow Routes • Solid Waste Facilities • Spot Elevations • Storm Surge data from USACE • Streams and Ponds • **Street Centerlines** • **Tax Parcel** • Trails • Trails (As obtained in house or from other agencies) • Transmission Lines
Applications Used:		
• ArcGIS (Standard) • ArcGIS DataQuery • ArcIMS My Neighborhood • CAMEO • MapQuest • Google Earth • Telephone Data		
Associated Activities:		
4.1.1 Emergency Operations Center - Support - EOC Activities		

4.1.1 Emergency Operations Center - Support - EOC Activities

Activity: Emergency Operations Center - Support - EOC Activities
Primary Point of Contact:
Greg Harrer
Overview:
Maintain and produce data and maps facilitating large-scale emergency management. Some items of importance are evacuation routes, road conditions, characteristics of population at risk, location of facilities and hospitals to be used in disasters, location of vulnerable populations at institutions, hazardous material, hurricane evacuation routes, schools, college campuses, assisted living facilities, and flood plains.
Interviewee(s) Providing Information:
Mark Demski
Process with GIS:
The process varies, depending what the needs are for any given event. Generally, the GIS personnel report to the EOC when it is activated and provide any mapping support requested. Between events, the staff provides hard copy maps as suggested by EOC management. Approximately 2 hours per month is spent in regular meetings, 3-5 days a year in specific training, and several more hours per month in various related meetings. For any event, EOC activations could last from a few hours to several weeks, depending on the size and scale of the emergency event. As technology continues to advance, the EOC relies more and more on GIS. GIS used for the following EOC functions: • Geocoding of special needs locations; • Geocoding of critical facilities (Facilities Geodatabase will improve this function); • On-the-fly geocoding of event-related features such as downed power lines, trees, etc.; • Determining evacuation routes; • Some modeling (e.g., chemical plume modeling using CAMEO) to determine how many people to evacuate, level of expected debris, property values, etc for certain events; and • Creating planning, mitigation, and preparation maps. • On-the-fly support. Mapping products include point of distribution maps (MEMA provides coordinates) and landfill maps for debris. Data is uploaded monthly onto an external hard drive for use if there is an event. Annual mapping activities with GIS are estimated at 184 hours per year (10 hours per month + mitigation maps 49 hours per year + response & recovery maps 15 hours per year). Annual Fire Department GIS support to the EOC (for regularly scheduled meetings, training, etc.) is estimated at 76 hours per year.

Process without GIS:

Emergency staff would do the best they could with hard copy maps that were available at the time. Assumed that hardcopy mapping products would take 2-3 times as long as the GIS maps which are estimated at 184 hours per year.

Benefits Assessment: (H, M, L) Identify confidence level

- High

Benefits to Using GIS for this Activity:

- Geographical data can enhance the response to emergency events, as well as facilitate planning for future events. Areas at risk can be identified, population at risk can be estimated, and the appropriate resources can be deployed for evacuation, sheltering, etc. Certain software add-ins can identify the spread of toxic gases in space and time and facilitate decisions regarding evacuation or sheltering in place. Software add-ins with GIS can perform notifications of population at risk.
- Information can be obtained much more quickly. Layers can be added for placement of resources available. No hard copy map would be able to adequately display all of the layers that would be needed and that are available through GIS.

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
460	260	200	1	200	$6,790.00

Total Annual Benefits: $6,790.00

Areas for Improvement:

- The Facilities geodatabase will greatly reduce the time needed to support the EOC.

New Opportunities:

- Modeling and analysis for mitigation
- Improved communication
- Use of GPS instead of geocoding for event-related features.

Benefits of Pursuing New Opportunities:

- Time and money spent geocoding and producing maps could be reduced.
- GPS could provide better spatial accuracy to point features.

4.2 Emergency Response

Program: Emergency Response
Primary Point of Contact:
Greg Harrer
Overview:
The Fire Department is responsible for maintaining a credible and effective team of experts and systems for responding to emergency incidents. A critical component of this preparedness is the development, maintenance, and analysis of geospatial data in support of all aspects of the department's activities. The FD Emergency Response program uses GIS technology for primary data gathering and display as well as for analysis and reporting. GIS technology helps support decision making processes, improving and enhancing the department's effectiveness in deploying people and apparatus to emergencies. All emergency apparatus carry maps books which have been developed using GIS.
Funding:
Most of the funding is from the County's general fund appropriation. Fees for inspections are returned to the general fund with no impact on the department's budget. Annual building inspections yield $750,000 per year. The department also receives Federal funding and grants are provided through the Department of Homeland Security, U.S. Fire Administration.
Mandates:
Federal funding and grants are dependant upon National Fire Information Reporting System (NFIRS) participation. Baltimore County Code requires annual building inspections. The National Fire Protection Association lays out standards for fire and rescue departments including standards for hazardous materials incidents; aircraft rescue and firefighting; qualifications of personnel; training; health, safety, and medical; incident management systems; and equipment and testing. The Fire Department requires there to be no gaps in rural water supply.
Political Benefits:
The Insurance Services Office, Inc (ISO) collects insurance-related statistics that are used by insurers to establish premiums. Fire insurance premiums paid by homeowners can be reduced by addressing specific issues; GIS can help the county address these issues. An example is the Rural Water effort that reduced ISO ratings (by an estimated average of 3 points) by having water sources mapped. GIS maps are also used to apply for grants.
Social Benefits:
GIS allows for analysis, helping to improve response time to fires, which in turn can save lives. GIS provides for spatial analysis, which helps justify the need for new stations. Through GIS, the Rural Water dataset was created, reducing ISO ratings, which in turn, reduces insurance premiums for residents by an estimated 50%. By having the Rural Water dataset, developers benefit when GIS determines they don't need to install water supplies; this benefit would essentially be passed onto the homeowner. Fire code requires that buildings be within a certain distance of a water source.

Products/Services:

- Paper map books
- GIS analysis of emergency incidents
- Redistricting
- Siting of new stations
- Workload and response balancing
- Gap analysis for rural water supplies
- Maps for grant applications

Customers:

- Emergency Field Personnel (Fire and EMS)
- Police Department
- The 911 Center
- Baltimore County Citizens
- Developers (for Rural Water dataset)
- Federal and state agencies

Data (Enterprise Layers are Listed in Bold):

- **AddressPoints (View)**
- **Buildings**
- **Census Block Groups (2000)**
- **Census Blocks (2000)**
- **Census Tracts (2000)**
- **Contours**
- County Boundary
- Development Plans
- Fire Battalion Boundary
- Fire Boxes
- Fire Hydrants
- Fire Stations
- Fire Stations Boundary
- Freeway Boxes
- Golf Courses
- Hydrants
- **Hydrology**
- Marine Fire Boxes
- Metro Railroad
- Mutual Aid Boundaries
- **Orthophoto (2005)**
- Park Points
- Railroads
- Reservoir
- **Roads**
- Rural Water Sources
- Schools—Point Location
- **Street Centerlines**
- **Tax Parcel**
- Trails
- Trails (As obtained in house or from other agencies)
- Transmission Lines
- Water Plats
- Wooded

Applications Used:

- ArcGIS (Standard)
- CAMEO
- MapQuest
- Google Earth

Associated Activities:
4.2.1 Emergency Response – Fire Survey
4.2.2 Emergency Response – Rural Water
4.2.3 Emergency Response – Redistricting Inspection Territories
4.2.4 Emergency Response – Analysis of the Distribution of Emergency Incidents
4.2.5 Emergency Response – Analysis to Support the Production of Running Assignments
4.2.6 Emergency Response – Workload Analysis with Spatial Component.
4.2.7 Emergency Response – Maps for Grants
4.2.8 Emergency Response – Districting (re) - Fire Stations and Firebox Boundaries
4.2.9 Emergency Response – Railroad Crossing Dataset
4.2.10 Emergency Response – New Street Notices and New Development Monitoring
4.2.11 Emergency Response – Produce Map Books for Emergency Apparatus
4.2.12 Emergency Response – Produce Wall Maps for EOC, Stations, and Special Projects
4.2.13 Emergency Response – Support Special Units HazMat and ATR

4.2.1 Emergency Response - Fire Survey

Activity: Emergency Response - Fire Survey

Primary Point of Contact:

Greg Harrer

Overview:

Fire Surveys are performed on large or high hazard buildings to show the locations of features that are important to response (e.g., pull boxes, hoses, stand pipes, building construction, stairwells, locations of hazardous materials, etc.) on building floor plans.

Interviewee(s) Providing Information:

Greg Harrer; Bill Martz

Process with GIS:

GIS is not being used to perform this activity.

Process without GIS:

Each fire station selects a location of interest each month. They visit the location and survey the building for construction type, hazards, and features that impact fighting a fire. A diagram is produced showing the location of relevant features on the floor plan along with notes regarding how a fire would be fought if one should occur at the location. Usually large buildings, high risk, or high occupancy locations are selected for this activity.

Benefits Assessment: (H, M, L) Identify confidence level

- Medium

Benefits to Using GIS for this Activity:

- GIS could be used to help to identify buildings needing a Fire Survey based upon the new Facilities geodatabase. Standardizing the process for the Fire Survey helps a faster adjustment for transferred personnel. If laptops are added into the apparatus, Fire Surveys could be linked directly to the point location of the building and would be available in an emergency. GIS would be a tool for distributing those surveys to more stations.

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
5	N/A	N/A	300	N/A	N/A

Total Annual Benefits: $

Areas for Improvement:
• Provide access to GIS data in all emergency vehicles and link fire survey data to GIS building locations. • PDFs of fire surveys could be made and kept on PC in the fire chief's car. • Obtain floor plans from PDM as part of the permitting process. Ideally, electronic floor plans.
New Opportunities:
• Install computers in all emergency vehicles. • Broader use of GIS (e.g., ArcReader, ArcExplorer) would allow personnel an easier way to measure distances to structures.
Benefits of Pursuing New Opportunities:
The capability of having more data at the emergency incidents making it easier to produce data and to make fewer errors.

4.2.2 Emergency Response - Rural Water Sources

Activity: Emergency Response - Rural Water Sources

Primary Point of Contact:

Greg Harrer

Overview:

The Fire Department uses GIS and GPS technology to identify rural water resources that can be used by emergency vehicles.

Interviewee(s) Providing Information:

Rick Deflavis

Process with GIS:

Information regarding rural water sources is provided by the Fire Marshall's office and the Rural Water Source (RWS) Committee. Shapefiles with rural water sources are updated as needed. The data is incorporated into paper maps produced from GIS for use in Emergency Vehicles.

Process without GIS:

Data is kept mainly in a spreadsheet. For visual purposes, such as for insurance ratings, a poster board with a large map and stickers are used to identify the locations of rural water sources and it is kept by the RWS committee (part of the volunteer service).

Benefits Assessment: (H, M, L) Identify confidence level

- Medium

Benefits to Using GIS for this Activity:

- Maps in all formats can now be easily produced for demonstration purposes or planning. Although not all rural water sources are currently mapped in GIS, the process will be completed with the completion of the revised firebox maps. The premiums for fire insurance dropped significantly by having better data presentation. The spatial representation is more accurate and there is a higher degree of cooperation from the volunteer fire companies to update their rural water sources. This also helps in facilitating the production of firebox maps and revisions.

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
7	1	6	12	72	$2,444.40

Total Annual Benefits: $ 2,444.40

Areas for Improvement:
• The county set up an IMS web site for the rural water site data so distances from structures to a water site could be measured for fire insurance purposes. However, this site is currently not in use and distances are measured in the field.
New Opportunities:
• This data layer is being updated with the current revision of firebox maps. • Wider use of GIS (e.g., ArcReader, ArcExplorer) would allow personnel an easier way to measure distances of RWS to structures.
Benefits of Pursuing New Opportunities:
• More accurate data • Faster response to incidents • Faster establishment of water supply at emergency incidents • Spatial analysis is possible • May reduce insurance premiums • Fire Marshals may save time determining needs for supply tanks in new developments.

4.2.3 Emergency Response - Redistricting Inspection Territories

Activity: Emergency Response - Redistricting Inspection Territories

Primary Point of Contact:

Rick Deflavis

Overview:

The Fire Department is required by county code to do inspections of buildings (other than single family homes) once a year. To fairly divide up labor hours among inspectors, inspection territories are redistricted every 2 - 3 years by "box grids."

Interviewee(s) Providing Information:

Rick Deflavis

Process with GIS:

This process is currently carried out by the Fire Marshall's staff without the benefit of GIS.

Process without GIS:

Statistics are compiled manually to try to determine workload for each district without the benefit of having the ability to visualize the demographics on a map.

Benefits Assessment: (H, M, L) Identify confidence level

- High

Benefits to Using GIS for this Activity:

- The ability to map the demographic information and visually display the areas would make the process more efficient and accurate.

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
190	N/A	N/A	5	N/A	N/A

Total Annual Benefits: $

Areas for Improvement:

- Use GIS with the Facilities Geodatabase and Fire Box Boundaries to determine the number of commercial properties requiring inspection in each area. This would be useful to determine the distribution of workload and make adjustments to inspection districts as necessary.

New Opportunities:

- Route planning, taking drive time into consideration

Benefits of Pursuing New Opportunities:

- More efficient inspection routes

4.2.4 Emergency Response - Analysis of the Distribution of Emergency Incidents

Activity: Emergency Response - Analysis of the Distribution of Emergency Incidents

Primary Point of Contact:

Greg Harrer

Overview:

Examination of the spatial distribution of calls for service and specific incidents to support various activities such as site selection and dispatch policy changes.

Interviewee(s) Providing Information:

Jim Webster, Irene Debye, Greg Harrer; James Korn; Mark Hubbard

Process with GIS:

Done on demand, which is about every two months. GIS is used to analyze call volume and decide where to put new units. Calls are geocoded so spatial distribution can be reviewed relative to type of call (e.g., medic or fire), response time, etc. Response data is also shared with State and Federal agencies.

Process without GIS:

Data would be analyzed manually on maps or in spreadsheets only.

Benefits Assessment: (H, M, L) Identify confidence level

- High

Benefits to Using GIS for this Activity:

- Time to perform analysis is reduced using GIS and results are more accurate. Analyses can also be performed more frequently.

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
17.5	5	12.5	6	75	$2,546.25

Total Annual Benefits: $2,546.25

Areas for Improvement:

- GIS- and GPS-enabled computers in Emergency Vehicles.
- Analyze demographics among fire incidents (including deaths) along with GIS for outreach programs.
- More data-driven outreach programs (injury and disease prevention).
- Add time of day to analyses.
- Real-time mapping of out-of-service hydrants.

New Opportunities:

- Resource deployment decisions based on software tools like CAD analyst

Benefits of Pursuing New Opportunities:
• Better resource deployment

4.2.5 Emergency Response - Analysis to Support the Production of Running Assignments

Activity: Emergency Response - Analysis to Support the Production of Running Assignments

Primary Point of Contact:

Greg Harrer

Overview: Running Assignments for each firebox, highway, and marine box are produced based on travel distance; this serves as the basis for CAD to determine which apparatus in which order is dispatched to an incident in a given box.

Interviewee(s) Providing Information:

Jim Webster, Irene Debye, Greg Harrer

Process with GIS:

Running assignments are revised when a new station is opened or when there is a significant change to the road network (e.g., the opening of a new highway). This is infrequent (twice in the last five years). Fire Apparatus drivers in the area provide information about routes from a particular station to an area, then the distance is measured on screen in ArcGIS using the measuring tool. The running assignment then becomes the order of the stations by distance with exceptions made by those knowledgeable in the area. There are also commercially available software packages (i.e., Deccan International software) that link with GIS and response data to let officials perform "what if" analysis regarding the location and addition of fire stations and workload balancing.

Process without GIS:

Before using GIS, a light-duty person would work on data collection for running assignments. They would first drive to a specific station and then drive various routes from the station to different locations, or between different locations, and measure the distances. The distances had to be analyzed by hand using ADC street map books. Any changes in the boundaries and roads could affect multiple stations on a single run card.

Benefits Assessment: (H, M, L) Identify confidence level

- High

Benefits to Using GIS for this Activity:

- Time is reduced greatly. If we could get the process automated, we could review running assignments on a regular basis to ensure the fastest possible emergency response.

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
420	7	413	0.5	206.5	$7,010.68

Total Annual Benefits: $7,010.68

Areas for Improvement:
• Use of Network Analyst extension, plus some batch processing could further reduce the time this activity takes. Then running assignments could be reviewed on a regular basis to ensure the fastest possible emergency response. • Possibly obtain Deccan International software to facilitate "what if" analysis regarding the deployment of fire department resources and station locations.
New Opportunities:
• Use Network Analyst
Benefits of Pursuing New Opportunities:
• Facilitate more accurate analysis of running assignments and more efficient running assignment reviews.

4.2.6 Emergency Response - Workload Analysis with Spatial Component

Activity: Emergency Response - Workload Analysis with Spatial Component

Primary Point of Contact:

Greg Harrer

Overview:

Adding a spatial component to data allows for the identification of specific county areas with high incident volume, high travel time, and thus improves the deployment of resources.

Interviewee(s) Providing Information:

Jim Webster; Irene Debye; Greg Harrer; Mark Hubbard

Process with GIS:

Data can be linked to firebox areas and presented visually. Data include call volume and type, and response time. There are also commercially available software packages (i.e., Deccan International software) that link with GIS and response data to let officials perform "what if" analysis regarding the location and addition of fire stations.

Process without GIS:

Previously, the Fire Department identified areas as candidates for new stations without GIS. Data analysis was performed without GIS and then data was presented on a map with hand written data. Statistics regarding calls, event types, and response times were tabulated and analyzed using data from the dispatch center. The data had a firebox area associated with it, allowing a geographical component to the analysis.

Benefits Assessment: (H, M, L) Identify confidence level

- High

Benefits to Using GIS for this Activity:

- Allows a visual and geographic component to be easily seen.
- Presentation quality maps can be used for documentation to government officials and decision makers.

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
35	14	21	4	84	$2,851.80

Total Annual Benefits: $2,851.80

Areas for Improvement:

- Possibly obtain Deccan International software to facilitate "what if" analysis regarding the deployment of fire department resources and station locations.

New Opportunities:
• Software add-ins could give the chief and decision makers new insights into resource deployment.
Benefits of Pursuing New Opportunities:
• More efficient use of the department's resources.

4.2.7 Emergency Response - Maps for Grant Applications

Activity: Emergency Response - Maps for Grant Applications

Primary Point of Contact:

Greg Harrer

Overview:

This activity involves using GIS to make maps included in grant application packages.

Interviewee(s) Providing Information:

Mark Hubbard; Greg Harrer

Process with GIS:

GIS is used to prepare some of the statistics needed for grant applications (number of population served, distance to station, call locations, response times, medic reports, etc.), and to prepare maps that are submitted with the grant application packages.

Process without GIS:

Maps would not be submitted with grant packages without GIS. Data analysis would be slower and less meaningful.

Benefits Assessment: (H, M, L) Identify confidence level

- High

Benefits to Using GIS for this Activity:

- Maps improve grant application packages.
- Better data analysis improves the county's chances of receiving grants.

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
10	2	8	5	40	$1,358.00

Total Annual Benefits: $1358.00

Areas for Improvement:

- More GIS support for grant applications.

New Opportunities:

- Use professional quality maps in grant applications

Benefits of Pursuing New Opportunities:

- Professional material increases the chances of getting grants funded.

4.2.8 Emergency Response - Districting (re) - Fire Stations and Firebox Boundaries

Activity: Emergency Response - Districting (re) - Fire Stations and Firebox Boundaries

Primary Point of Contact:

Greg Harrer

Overview:

Station boundaries and box boundaries are set to promote efficient response to emergency incidents; firebox boundaries are closely related to running assignments.

Interviewee(s) Providing Information:

Jim Webster; Irene Debye; Greg Harrer

Process with GIS:

The current GIS boundary file was originally created for the Fire Department by the Baltimore Metropolitan Council (BMC). Updates are performed as follows: Fire Apparatus drivers in the area provide information about routes from a particular station to an area, and then the distance is measured on screen in ArcGIS using the measuring tool. The running assignment then becomes the order of the stations by distance with exceptions made by those knowledgeable in the area. Station areas are split to allow the closest station to be the first due. Subsequent changes in distances by the subsequently due apparatus cause a change in the firebox area.

Process without GIS:

Before GIS, a light duty person would work on data collection for running assignments by driving various routes in the affected area and recording distances. This information was used to determine where to set the boundaries for a firebox area.

Benefits Assessment: (H, M, L) Identify confidence level

- Medium

Benefits to Using GIS for this Activity:

- Time savings
- Improved accuracy
- More frequent review of running assignments

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
140	21	119	0.5	59.5	$2,020.02

Total Annual Benefits: $2,020.02

Areas for Improvement:

- Network Analyst along with some automation could add to time savings considerably, and facilitate frequent reviews of firebox areas and running assignments.

New Opportunities:
• Pursue further automation of this process by using Network Analyst along with further programming.
Benefits of Pursuing New Opportunities:
• More efficient data processing. • More accurate information, which supports better decision making.

4.2.9 Emergency Response – Railroad Crossing Dataset

Activity: Emergency Response - Railroad Crossing Dataset

Primary Point of Contact:

Greg Harrer, Rick Petry

Overview:

This activity involves creation and maintenance of a railroad crossing dataset for CSX tracks. In areas of the county where railroads are located, GIS could help pinpoint driveways divided by the rail lines. Currently available data are far from complete. Not all driveways are marked by signage from the rail owner with a number. Ascertaining this data would help both the county and the rail line.

Interviewee(s) Providing Information:

Greg Harrer

Process with GIS:

This project has not been incorporated into GIS at this time.

Process without GIS:

As time permits, Fire Department Administrative Duty Officers (ADOs) go into the field to collect data regarding the railroad crossings at all roads and private driveways. ADC maps are used in the field. This data will be used to notify train traffic controllers should an incident occur where the railroad operation must be shut down. Accurate data is needed because there will be communication with a railroad traffic controller who might be thousands of miles away from the area. The crossings have a unique identifier and this goes into the Computer Aided Dispatch (CAD) system.

Benefits Assessment: (H, M, L) Identify confidence level

- High

Benefits to Using GIS for this Activity:

- GIS can help identify all areas where field data must be collected.
- GIS can produce maps and help disseminate the data with a spatial component. This will be done on paper maps initially.
- Future GIS capabilities in emergency apparatus and command vehicles will ensure more accurate communication regarding which railroad intersections must be closed.

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
42	N/A	N/A	1	N/A	$0

Total Annual Benefits: $0

Areas for Improvement:
• Put this data with GIS capabilities into all emergency apparatus and command (Battalion Chief and District Chief vehicles) and into the dispatch center for the ADOs.
New Opportunities:
• Disseminate this information through GIS enabled computers. • Could help in identifying where driveways are divided by railroad lines.
Benefits of Pursuing New Opportunities:
• Facilitate accurate communication with railroads during emergency incidents. • Quick and accurate response to data for Administrative Duty Officers.

4.2.10 Emergency Response - New Street Notices and New Development Monitoring

Activity: Emergency Response - New Street Notices and New Development Monitoring

Primary Point of Contact:

Greg Harrer

Overview:

As development progresses within the county, the Fire Department must keep field personnel aware of new streets and development, update firebox maps, and evaluate the impact of new streets on firebox alignment and running assignments. Access to the periodic updates of small scale centerline data will facilitate this process.

Interviewee(s) Providing Information:

Greg Harrer

Process with GIS:

The Office of Permits and Development Management sends plans to the Fire Department when new development is taking place. A notice is provided to field personnel alerting them to the development. The notice is produced by incorporating the information into a document consisting of a narrative produced in MS Word and a GIS map. If the proposed streets are not already in GIS they will be sketched into a shapefile for display with old roads and firebox boundaries from GIS. Sometime the new roads are already in GIS. In the past, this activity was performed using Baltimore Metropolitan Council (BMC) data until the Fire Department switched to using county GIS data.

Process without GIS:

The process without GIS involves producing a hand drawing of the new street on an existing drawing of area streets along with a narrative of the changes.

Benefits Assessment: (H, M, L) Identify confidence level

- Medium

Benefits to Using GIS for this Activity:

- Time is saved and a more professional product is produced.

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
40	20	20	12	240	$8,148.00

Total Annual Benefits: $8,148.00

Areas for Improvement:
• If proposed streets could be added to the county GIS data in a timely fashion, the notices could be produced based solely on streets that are coded as proposed in the county GIS data. This would eliminate having to review construction drawings to identify new streets. The Fire Department will evaluate this process in the near future. The county may have to improve the process of getting new developments into the GIS data for it to serve the needs of the Fire Department.
New Opportunities:
• Perform task based on current data in small scale centerline database. Could search database for newly added streets and develop notification document.
Benefits of Pursuing New Opportunities:
• Would ensure complete and accurate data dissemination to the field personnel.

4.2.11 Emergency Response - Produce Map Books for Emergency Apparatus

Activity: Emergency Response - Produce Map Books for Emergency Apparatus
Primary Point of Contact:
Greg Harrer
Overview:
Maps are produced to be carried in all emergency vehicles. There is a map book page for each firebox, freeway box, and marine box. There are approximately 850 fireboxes, 50 marine boxes, and 50 freeway boxes. Each map is customized in scale and layout. Special detail is developed for institutions such as college campuses, hospitals, and multi-building institutions. Reference is made to related documents called fire surveys that have information specific to firefighting in larger buildings. Completeness of data, labeling, and annotation is of particular importance, but also visibility on the map, such as annotation above hydrants. If a battalion, station, or firebox boundary changes, all fireboxes affected by that area have to be redrawn to reflect the changes. Maps with contours and trails information will expedite search and rescue in remote areas such as State Parks, along streams, rivers, and reservoirs.
Interviewee(s) Providing Information:
Jim Webster; Irene Debye; Greg Harrer; Rick Petry; George Dulina; Vernon Adamson
Process with GIS:
This activity consumes 80 – 90 percent of time for one person because the Fire Department is currently revising a complete set of new maps from GIS. Approximately 25 field map representatives are involved. Generally there is one map representative for each of the career stations and some of them also serve as map representatives for a group of volunteer stations. Field map representative report any changes or exceptions to the mapping section. They are also responsible for keeping the map books on each apparatus within their responsibility up to date. This is a continuous process and applies to the maintenance of datasets as well. Map updates are marked as hand annotation on the paper maps. These are then incorporated into new map books and datasets as needed. County GIS data layers are used to create the map books including schools, buildings, property lines, parks, nursing homes, and topography. Additionally, shapefiles of trails are incorporated into the map book series. Separate and specific maps showing trails and contours are also made.
Process without GIS:
This process was done manually by hand-drawing every map and they were not spatially accurate. Changes made in one firebox map were not always reflected in adjacent firebox maps.
Benefits Assessment: (H, M, L) Identify confidence level
• High

Benefits to Using GIS for this Activity:

- Converting to digital-created firebox maps allows updating all firebox maps to reflect current information.
- Firebox maps are accurate. Road curves and other visual spatial clues can be picked up from the firebox maps.
- Changes can be done faster and more easily (including changes affecting adjacent fireboxes).

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
96	32	64	52	3,328	$112,985.60

Total Annual Benefits: $112,985.60

Areas for Improvement:

- Place GIS capabilities in all emergency vehicles.
- Obtain more datasets (waiting for more data from Maryland DNR regarding trails in some of the state owned lands and parks).
- Make map scales more consistent.
- Add additional obstacles to the maps

New Opportunities:

- This type of data could be used most expeditiously if GIS- and GPS-enabled computers were deployed in the emergency vehicles.

Benefits of Pursuing New Opportunities:

- Mobile GIS technology deployed in police vehicles would provide for more accurate and timely decision making and greatly reduce the need to make paper map books for each vehicle.

4.2.12 Emergency Response - Produce Wall Maps for EOC, Stations, and Special Projects

Activity: Emergency Response - Produce Wall Maps for EOC, Stations, and Special Projects

Primary Point of Contact:

Greg Harrer

Overview:

GIS data provide information to emergency managers, station personnel, and also is used in special projects.

Interviewee(s) Providing Information:

Jim Webster; Irene Debye; Greg Harrer; Mark Demski

Process with GIS:

Needed data is accessed from various data sets and incorporated into map documents. The documents are reviewed by emergency management personnel and refined until they are satisfied with the map.

Process without GIS:

This process has not been performed without GIS. It is assumed that without GIS it would take 2-3 times longer.

Benefits Assessment: (H, M, L) Identify confidence level

- High

Benefits to Using GIS for this Activity:

- GIS datasets are used from the county as well as various other sources. The results are high quality functional maps.
- Without GIS capability, none of the maps, such as flood maps with contour lines, would be available for the project for hurricane preparedness or for the EOC because they cannot be hand drawn. Stations would have to buy expensive wall-sized maps, which would not be customized for their response area.

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
588	196	392	1	392	$13,308.40

Total Annual Benefits: $13,308.40

Areas for Improvement:

- Improve the identification of needs and capabilities between GIS and emergency managers.

New Opportunities:

- There are many possibilities for other maps and analysis.

Benefits of Pursuing New Opportunities:
• Data access and accurate, reliable data.

4.2.13 Emergency Response - Support Special Units HazMat and ATR

Activity: Emergency Response - Support Special Units HazMat and ATR

Primary Point of Contact:

Greg Harrer

Overview:

The Hazardous Material Team carries a PC in their vehicle. In the future they may be able to carry GIS data that includes industrial sites and types of material stored. Additionally, other GIS data sets would be helpful including contours, hydrology, storm drains, etc. The ATR team performs specialized rescues. GIS data would be helpful to them, as well.

Interviewee(s) Providing Information:

Greg Harrer

Process with GIS:

This is a future activity. GIS is not being used for it at this time.

Process without GIS:

Stream or pipe flow is often determined by using dye or a float to see where a stream, and consequently hazardous material, will flow.

Benefits Assessment: (H, M, L) Identify confidence level

- High

Benefits to Using GIS for this Activity:

The HAZMAT team has need for information regarding contours, sewer and storm drain information, hydrology (stream flow), hazardous material locations, and many more spatially related data sets. They currently do not have full GIS capability on the HAZMAT vehicle.

Annual Savings from Use of GIS:

Staff Hours w/o GIS (Manual)	Staff Hours with GIS	Difference	Annual # Iterations Per Year	Total Hours Saved Using GIS	Annual Time Savings Benefit (Based on $33.95/hr)
N/A	N/A	N/A	N/A	N/A	$0

Total Annual Benefits: $0

Areas for Improvement:

- Develop GIS Datasets

New Opportunities:

- Provide GIS enabled computer in the Hazmat Vehicle Unit.

Benefits of Pursuing New Opportunities:
• Safety of personnel and the community. • Ability to facilitate quick decisions at HAZMAT incidents.

THIS PAGE INTENTIONALLY LEFT BLANK

5 Short-form Online Questionnaires

Agency Fire Department

Name Bruce Kesting

Job Title Battalion Fire Chief

Briefly, what activity(s) do you perform within your department?

I operate in Field Operations covering the central part of the County. I respond to structural building fire, rescues, large woodland fires, and occasional hazardous materials. I participate in meetings. Administrative duties, Training, Visiting stations to monitor operations

Approximately what percentage of your work week do you spend for each activity identified in question #9?

responding on calls less than 10% Administrative 45% Driving 15% Visiting stations 20% training 5% Other 5% these are approximate

Do you use GIS data or databases (e.g., orthophotos, topography, property maps) to perform your daily job? If yes, please provide an example.

I have not used one yet, But for a large scale field/brush/woods fire a topographic map would be very valuable. this would help on rescues on rivers and assigning units based on landmarks

Do you use GIS applications (e.g., DataQuery, MyNeighborhood websites) to perform your daily job? If yes, please provide an example.

No. I am not active on web sites

Do you use spatial analysis (e.g. geocoding, routing) to perform your daily job? If yes, please provide an example.

I do not believe so.

Do you use or produce hardcopy or digital maps to perform your daily job? If yes, please provide an example.

We use maps to see exactly where the call is and how to respond to it---what route of travel to use Also where are the hydrants? where are the large value buildings? where are the populous buildings?

Do you provide data products or services to other agencies or the public? If yes, please provide an example.

Fire and EMS Services

Do you perform any GIS data maintenance activities? If yes, please provide an example.

I do not know if this is GIS or not. Frankly I am a little fuzzy on what these things actually are. We need our maps updated with new streets added as they are built.

Briefly list the activities that you perform using GIS? (create maps for master plan, locate water customer addresses for work orders, etc.)

Updated correct maps

What activities do you think could benefit from use of (or increased use of) GIS?

Maps of streets and hydrants, target hazards Maps including watershed areas, forests, waterways, streams, rivers, Topography of City and State parkland and reservoirs

Please provide any additional comments you have regarding the use of GIS technology by your department, agency or the County as a whole.

no additional comments

Agency Fire Department

Name George Dulina, Jr.

Job Title Fire Lieutenant

Briefly, what activity(s) do you perform within your department?

As a Fire Lieutenant assigned to an Engine Company in emergency operations I assist the station Captain and function as a first line supervisor in their absence. Responsible for Fire Station and Shift Administrative functions, Training of Shift Personnel and emergency/non-emergency responses with the Engine Company.

Approximately what percentage of your work week do you spend for each activity identified in question #9?

Administrative Functions: 55% Training Functions: 25% Emergency/NonEmergency Responses: 20%

Do you use GIS data or databases (e.g., orthophotos, topography, property maps) to perform your daily job? If yes, please provide an example.

Daily use of Fire Station/Apparatus Phantom Box Mapping for emergency/non-emergency responses to requests for customer assistance. Coordinate and update mapping for our Fire District on a regular basis with assistance from Fire Department Information Services.

Do you use GIS applications (e.g., DataQuery, MyNeighborhood websites) to perform your daily job? If yes, please provide an example.

Use Phantom Box Mapping on a daily basis to plan response routes and determine water supply available upon requests for assistance from the public to Fire/Rescue or Medical

Do you use spatial analysis (e.g. geocoding, routing) to perform your daily job? If yes, please provide an example.

None

Do you use or produce hardcopy or digital maps to perform your daily job? If yes, please provide an example.

Maintain a Phantom Box Map for areas of response.

Do you provide data products or services to other agencies or the public? If yes, please provide an example.

None

Do you perform any GIS data maintenance activities? If yes, please provide an example.

Assist Fire Department GIS/Mapping Section with updates and/or physical changes to street mapping in our District.

Briefly list the activities that you perform using GIS? (create maps for master plan, locate water customer addresses for work orders, etc.)

Utilize mapping to locate customer locations, water supply for fire suppression, specific hazard locations, etc.

What activities do you think could benefit from use of (or increased use of) GIS?

Locating the scene of the customer in an emergency is very important. Any assistance that GIS could provide would greatly assist personnel in performing their duties.

Please provide any additional comments you have regarding the use of GIS technology by your department, agency or the County as a whole.

Very important that information is updated and forwarded to the end user ASAP.

Agency Fire Department

Name Gregory Harrer

Job Title Management Analyst

Briefly, what activity(s) do you perform within your department?

Statistical Analysis GIS Administrative GIS Support the Emergency Operations Center.

Approximately what percentage of your work week do you spend for each activity identified in question #9?

Statistical Analysis 45% GIS 40% Administrative 10% GIS Support the Emergency Operations Center 5%

Do you use GIS data or databases (e.g., orthophotos, topography, property maps) to perform your daily job? If yes, please provide an example.

Yes, I use data - roads, firebox boundaries, hydrants, contours, trails, etc. to produce firebox maps, running assignments, station locations, station areas, firebox areas. Orthophotos help use determine features for locating items on our maps.

Do you use GIS applications (e.g., DataQuery, MyNeighborhood websites) to perform your daily job? If yes, please provide an example.

Very Seldom. DataQuery runs very poorly over the network to the public safety building.

Do you use spatial analysis (e.g. geocoding, routing) to perform your daily job? If yes, please provide an example.

Yes. Geocode incidents, Develop lists of features in certain firebox area, measure travel distances to develop running assignments.

Do you use or produce hardcopy or digital maps to perform your daily job? If yes, please provide an example.

Yes. Each Fire and EMS vehicle carries a map book of the firebox areas and freeway box areas. Dispatch has map book of all firebox, freeway box and marine box areas. There are 850 firebox areas, approximately 50 freeway boxes and approximately 50 marine boxes. The maps show features such as roads, schools, common places, hydrants and water sources. The maps may have references to fire surveys which are plans regarding specific facilities with info useful to fighting a fire at that facility. The maps must be updated as new roads and developments are built in the county.

Do you provide data products or services to other agencies or the public? If yes, please provide an example.

We work with the dispatch center very closely to ensure that dispatching occurs according to firebox boundaries and running assignments. Additionally, we answer requests from the public such as where is the closest fire station, hydrant or water source.

Do you perform any GIS data maintenance activities? If yes, please provide an example.

We have just begun editing the firebox, freeway box and marine box boundaries. This uses SDE database and topology editing tools. This was a task that was previously performed under

Briefly list the activities that you perform using GIS? (create maps for master plan, locate water customer addresses for work orders, etc.)

Create maps for emergency vehicles. Develop running assignments for fireboxes. Present data such as incidents. Edit and maintain data - fire hydrants, water holes, firebox boundaries, freeway box boundaries, marine box boundaries. Provide GIS support for the Emergency operations Center. Provide information to the field regarding proposed streets and new

What activities do you think could benefit from use of (or increased use of) GIS?

We could use a user friendly version of network analyst to facilitate the development of running assignments and new firebox boundaries. Computers and GIS in vehicles could help reduce the labor demands of producing hard copy maps. The difficulty with hard copy maps is that labeling and annotation must be complete and this turns out to be very labor intensive. Computers and GIS in vehicles would allow for a variety of data sources to be available to field personnel, rather than be constrained to what can be placed on a hard copy map. Firefighting: Additional data to field personnel such as more data about the water system - flow data, water main size, would be helpful. Data such as topo and contours would help in a variety of situations. Data about the location of hazards and hazardous material would be helpful.

Please provide any additional comments you have regarding the use of GIS technology by your department, agency or the County as a whole.

Staffing: Current staffing for GIS in the department is an Engineering Assistant and a Management Analyst, along with a GIS intern who works 20 hours per week. Both the Management Analyst and the Engineering Assistant perform other duties as well, probably devoting only 50% and 75% respectively to GIS. Both full time employees come to the work with backgrounds other than GIS. Training is crucial, however, this field is changing rapidly and the demand for skills has changed with time. Four years ago we were dealing with shapefiles and having edits done under contract. Now we are using geodatabases and performing the edits using topology tools etc. This requires quite advanced skills. Another issue is connectivity between the Public Safety Building and the main county servers. The connection is too slow for editing geodatabases and too slow for the transfer of large data sets, as well as, too slow for map documents that connect directly to a data source over the network.

Agency Fire Department

Name Irene Debye

Job Title Office Automation Assistant

Briefly, what activity(s) do you perform within your department?

Creating Firebox, Station and Freeway-Box Maps Creating Layers and updating current layers for the fire department needs. Creating specialized maps for the emergency operation center for the Baltimore County creating specialized maps, such as trail maps, access maps around wooded areas and especially around the water reservoirs and rivers in Baltimore County

Approximately what percentage of your work week do you spend for each activity identified in question #9?

80% for creating and updating layers 10% for updating and creating fireboxes 10% for the other maps or more if needed

Do you use GIS data or databases (e.g., orthophotos, topography, property maps) to perform your daily job? If yes, please provide an example.

I use orthophotos to accurate pinpoint certain buildings (such as fire stations, schools, etc) and water tanks and to evaluate 'data' from different sources, such as roads on older maps and current SDE road data, water sources etc. Cadastral information to identify the address of hydrants and to identify or change the boundaries for new and old fireboxes Contour lines are used to create specialized maps for rescue and forest fires around the reservoirs and rivers Hydrant, rural water sources, large power transmission Lines, schools, nursing homes, hydrology data, parks, etc., which are partially in the SDE database for the firebox maps.

Do you use GIS applications (e.g., DataQuery, MyNeighborhood websites) to perform your daily job? If yes, please provide an example.

I use ArcGIS for all mappings.

Do you use spatial analysis (e.g. geocoding, routing) to perform your daily job? If yes, please provide an example.

Not on a daily bases, but I have used geocoding for identifying addresses, such as schools, nursing homes, etc.

Do you use or produce hardcopy or digital maps to perform your daily job? If yes, please provide an example.

Currently, most of my products are pdf-files (fireboxes), which is sent out to the stations and printed out. Larger maps (such as 42in x 74in maps) are printed out on the plotter. For ourselves, we keep a digital set.

Do you provide data products or services to other agencies or the public? If yes, please provide an example.

The fire department has just started to create and maintain its own firebox, station, freeway, etc. data set on the county-wide SDE server with the help of the Baltimore County OIT. Current layers, such as a fire station point layer, are being prepared to be made available on the SDE server. The fire department is also working now more closely together to identify old or false data, which are currently on the SDE server.

Do you perform any GIS data maintenance activities? If yes, please provide an example.

Yes, any layer, except the road and cadastral layers, is currently maintained also locally, such as layers for schools, school buildings, larger commercial buildings etc., which are needed for

Briefly list the activities that you perform using GIS? (create maps for master plan, locate water customer addresses for work orders, etc.)

see 9

What activities do you think could benefit from use of (or increased use of) GIS?

After participating on the CAMEO training session, it is really clear, that the fire department and the emergency response teams could greatly benefit having maps readily available or having mobile systems available with all necessary data sets. There are certainly emergency maps missing for all larger public places and plants with chemicals, which identifies usable locations in emergencies, evacuation buffers etc. Mobile systems on engines could also allow the first responders to be more prepared for a situation. The printed current map system does not allow one to 'zoom in' to an area, display building layout, chemical storage, etc. on a click of a button.

Please provide any additional comments you have regarding the use of GIS technology by your department, agency or the County as a whole.

Agency Fire Department

Name James Korn

Job Title Fire Director

Briefly, what activity(s) do you perform within your department?

Oversee the following activities/departments: Infection Control Records Fire & Life Safety Education Public Information

Approximately what percentage of your work week do you spend for each activity identified in question #9?

Varies week to week.

Do you use GIS data or databases (e.g., orthophotos, topography, property maps) to perform your daily job? If yes, please provide an example.

No.

Do you use GIS applications (e.g., DataQuery, MyNeighborhood websites) to perform your daily job? If yes, please provide an example.

No.

Do you use spatial analysis (e.g. geocoding, routing) to perform your daily job? If yes, please provide an example.

No.

Do you use or produce hardcopy or digital maps to perform your daily job? If yes, please provide an example.

Our field personnel use maps routinely to locate and determine the best route of travel to emergency incidents.

Do you provide data products or services to other agencies or the public? If yes, please provide an example.

No.

Do you perform any GIS data maintenance activities? If yes, please provide an example.

No.

Briefly list the activities that you perform using GIS? (create maps for master plan, locate water customer addresses for work orders, etc.)

None.

What activities do you think could benefit from use of (or increased use of) GIS?

We are planning to transition to electronic EMS reporting. We want to use the hardware for viewing electronic map data to facilitate quicker responses to emergency incidents, eliminating the use of paper maps. On certain types of incidents, including search & rescue, rural incidents, flooding, and others, this technology would be useful. The technology would help determine the best locations for additional rural water sources. GPS vehicle locating technology could be used to enable dispatch to locate and alert the fire department unit closest to the emergency incident location.

Please provide any additional comments you have regarding the use of GIS technology by your department, agency or the County as a whole.

I can see us using this technology to enhance and focus our fire and life safety education activities. For example, to identify areas of highest incidence of dwelling fires, or to identify areas with a high incidence of injuries to our geriatric population. I am sure that as with most other new technologies, there will be may other applications that evolve as people learn more about the technology and become comfortable using it.

Agency Fire Department

Name James Webster

Job Title Engineering Asst.

Briefly, what activity(s) do you perform within your department?

Revise and maintain the Fire Boxes, Fire Surveys, Marine Boxes, Highway Boxes,

Approximately what percentage of your work week do you spend for each activity identified in question #9?

Fire Boxes 80 Fire Surveys 10 Highway Boxes 5 Marine Boxes 5

Do you use GIS data or databases (e.g., orthophotos, topography, property maps) to perform your daily job? If yes, please provide an example.

Yes, GIS Data when adjusting/revising the Fire Maps for Property Locations.

Do you use GIS applications (e.g., DataQuery, MyNeighborhood websites) to perform your daily job? If yes, please provide an example.

No

Do you use spatial analysis (e.g. geocoding, routing) to perform your daily job? If yes, please provide an example.

No

Do you use or produce hardcopy or digital maps to perform your daily job? If yes, please provide an example.

Yes, both, digital for quick reference. Hardcopy for the emergency vehicles

Do you provide data products or services to other agencies or the public? If yes, please provide an example.

Yes, Fire Boxes to Police/ 911 Center for emergency calls

Do you perform any GIS data maintenance activities? If yes, please provide an example.

No

Briefly list the activities that you perform using GIS? (create maps for master plan, locate water customer addresses for work orders, etc.)

Create maps for master plans, Fire hydrant layer, draft sites,

What activities do you think could benefit from use of (or increased use of) GIS?

n/a

Please provide any additional comments you have regarding the use of GIS technology by your department, agency or the County as a whole.

n/a

Agency Fire Department

Name Mark F. Hubbard

Job Title Assistant Fire Chief

Briefly, what activity(s) do you perform within your department?

Executive Staff Management

Approximately what percentage of your work week do you spend for each activity identified in question #9?

100%

Do you use GIS data or databases (e.g., orthophotos, topography, property maps) to perform your daily job? If yes, please provide an example.

No

Do you use GIS applications (e.g., DataQuery, MyNeighborhood websites) to perform your daily job? If yes, please provide an example.

No

Do you use spatial analysis (e.g. geocoding, routing) to perform your daily job? If yes, please provide an example.

No

Do you use or produce hardcopy or digital maps to perform your daily job? If yes, please provide an example.

No

Do you provide data products or services to other agencies or the public? If yes, please provide an example.

No

Do you perform any GIS data maintenance activities? If yes, please provide an example.

No

Briefly list the activities that you perform using GIS? (create maps for master plan, locate water customer addresses for work orders, etc.)

Review reports from others that may have GIS products

What activities do you think could benefit from use of (or increased use of) GIS?

Strategic Fire Department decisions including monitoring and managing current and future service needs

Please provide any additional comments you have regarding the use of GIS technology by your department, agency or the County as a whole.

GIS technology plays a very important role in providing information to support strategic decisions. Access from the agency level is imperative.

Agency Fire Department

Name Richard Petry

Job Title Fire Director of Fire Communications

Briefly, what activity(s) do you perform within your department?

Communications and data for emergency responders both career and volunteer.

Approximately what percentage of your work week do you spend for each activity identified in question #9?

90%

Do you use GIS data or databases (e.g., orthophotos, topography, property maps) to perform your daily job? If yes, please provide an example.

Mapping of hydrants, streets, block files

Do you use GIS applications (e.g., DataQuery, MyNeighborhood websites) to perform your daily job? If yes, please provide an example.

DataQuery

Do you use spatial analysis (e.g. geocoding, routing) to perform your daily job? If yes, please provide an example.

yes. not on a daily basis

Do you use or produce hardcopy or digital maps to perform your daily job? If yes, please provide an example.

yes not on daily basis

Do you provide data products or services to other agencies or the public? If yes, please provide an example.

yes. share dsat for block files, mapping , with other groups

Do you perform any GIS data maintenance activities? If yes, please provide an example.

not at this time

Briefly list the activities that you perform using GIS? (create maps for master plan, locate water customer addresses for work orders, etc.)

mapping, hydrants, water mains. telephone calls, geography

What activities do you think could benefit from use of (or increased use of) GIS?

better location of vital infrastructure for the safety of the public

Please provide any additional comments you have regarding the use of GIS technology by your department, agency or the County as a whole.

Agency Fire Department

Name William Martz

Job Title IT Manager

Briefly, what activity(s) do you perform within your department?

Manage a team of 7 employees. Work on various projects for the Department. Trouble shoot computer related problems.

Approximately what percentage of your work week do you spend for each activity identified in question #9?

(1) 30% (2) 50% (3) 20%

Do you use GIS data or databases (e.g., orthophotos, topography, property maps) to perform your daily job? If yes, please provide an example.

No

Do you use GIS applications (e.g., DataQuery, MyNeighborhood websites) to perform your daily job? If yes, please provide an example.

No

Do you use spatial analysis (e.g. geocoding, routing) to perform your daily job? If yes, please provide an example.

No

Do you use or produce hardcopy or digital maps to perform your daily job? If yes, please provide an example.

No

Do you provide data products or services to other agencies or the public? If yes, please provide an example.

No

Do you perform any GIS data maintenance activities? If yes, please provide an example.

No

Briefly list the activities that you perform using GIS? (create maps for master plan, locate water customer addresses for work orders, etc.)

None

What activities do you think could benefit from use of (or increased use of) GIS?

1-Insurance information dealing will water supplies 2-Hyrant active or need service 3-Hazmat Material (Hot zones) 4-Location of Hospitals, Senior Living, schools, and day Care Facilities 5-Disaster Areas - Flood and forestry

Please provide any additional comments you have regarding the use of GIS technology by your department, agency or the County as a whole.

Personnel