

MEMORANDUM

March 11, 2010

TO: Management and Fiscal Policy Committee
Public Safety Committee

FROM: Dr. Costis Toregas, Council IT Adviser
Minna K. Davidson, Legislative Analyst 

SUBJECT: FY11-16 Capital Improvements Program: Public Safety System Modernization
(continued)

Executive's Recommendation

For FY11-16, the Executive recommends \$53.7 million for a Public Safety System Modernization Project. The Executive's recommendation would fund three elements of the modernization: 1) replacement of the Computer Aided Dispatch (CAD) system; 2) replacement of the Fire Station Alerting system (formerly a separate CIP project that has been incorporated into this project); 3) acquisition of P-25 standard radio devices. A subsequent phase of the project would include replacement of the radio infrastructure, estimated at an additional \$50 million. The current project includes \$1.7 million to plan for the radio infrastructure phase. The current project is recommended to be funded with a combination of \$3.3 million in Federal Aid, \$3.8 million in GO bonds, and \$46.5 million in short-term financing. The Executive's recommended PDF for this project is attached on © 17.

MFP/PS Committees' Review

The Management and Fiscal Policy (MFP) and Public Safety (PS) Committees began their review of the Public Safety System Modernization project on February 22. At that time, the Committees received overview information about the Executive's recommendations for the project, and reviewed Council staff comments pointing out areas where further information was needed. The Committees supported the project in concept, but felt that more detailed information was needed before making a recommendation to the Council. (The February 22 worksession packet is attached on © 12-49.)

In particular, the Committees requested:

- More definition of the project including specifics about the purchase and replacement of the system, overall schedule, and breakout of yearly expenditures.
- Completion of the table on © 11 (now © 27) of the February 22 packet.
- More information about the governance model including how final decisions will be made and conflicts will be resolved.
- Responses to the other questions in the February 22 packet, especially related to the estimated additional operating costs and the process for obtaining input from all users in the field.
- A comparison of proposed PSSM costs with the costs for similar projects in other jurisdictions.
- Information on whether debt service costs for payback of the short term financing are included in operating budget assumptions for the next five years.

For the March 15 session, Executive staff provided the following:

- A completed table showing a breakout of expenditures over the six year period for the elements of the CIP project (© 2).
- A breakout showing the anticipated elements of the second phase of the project – replacement of the radio infrastructure (© 3). Executive staff told Council staff that ideally, the second phase would be programmed in FY13 and FY14, but stressed that the Executive has made no decisions about the timeframe yet, and any decisions in the future will depend upon the availability of funds, other priorities in the CIP, and overall economic conditions. Estimated costs for two-year implementation of Phase Two would be \$19.1 million to \$23.9 million in year one, and \$22 million to \$27 million in year two.
- An updated overview breakout showing total costs for the current elements of CIP project (© 4).
- Information about the contract award for the Fairfax County Computer Aided Dispatch and Records Management system (© 5-9).
- No additional written information has been provided about the governance structure for this project, but Executive staff said that the CAO or his designee will be present at the March 15 Committee session to discuss the governance structure in more detail.

Council Staff Recommendations

Executive staff have provided more information about the cost breakout for this project, but have said that it will not be possible to provide many of the details that the Committees have requested until project planning has taken place, an RFP has been issued, and bids have been received.

Under the circumstances, for FY11, Council staff's general recommendations would be to: 1) appropriate funding to plan for the CAD and radio infrastructure replacements; 2) appropriate funding to purchase a reduced number of radios; 3) shift funding for Station Alerting into FY12; and 4) modify the governance structure to follow the governance model in the Technology Modernization project. Decisions about further appropriations can be made in the context of the FY12 capital budget request after substantial planning has occurred and more detail about the project is available. Specific recommendations about modifications to the Cost Elements and text of the PDF are listed below. Modifications to the expenditure and funding schedules are shown on the marked-up PDF on © 1.

Planning, Design, Supervision (CAD/Radio Infrastructure/Station Alerting): The Executive recommends a total of \$925,000 for Planning, Design, and Supervision in FY11 which would be broken out as follows:

CE Rec. FY11 Planning	Amount
Radio Infrastructure replacement	300,000
CAD replacement	550,000
Station Alerting	75,000
Total	925,000

Council staff recommends funding a total of \$850,000 in FY11 (\$300,000 for Radio Infrastructure and \$550,000 for CAD replacement), and shifting the \$75,000 for Station Alerting into FY12 (see discussion of Station Alerting below).

Construction (Station Alerting): The Executive recommends \$125,000 for construction in FY11. It is Council staff's understanding that this amount would be used to install the new Station Alerting system in one fire station. ***Council staff recommends shifting the \$125,000 for construction and the \$75,000 for Station Alerting planning into FY12.*** Although Fire and Rescue has previously made it clear that the need for a new Station Alerting system is immediate, the Station Alerting system (which was formerly planned as a stand-alone system in a stand-alone project) was incorporated into the PSSM project to integrate it with the new CAD system.

Council staff recommends including the Station Alerting system requirements in the CAD Business requirements and reflecting in the CAD RFP the County's interest in maintaining full Station Alerting functionality at the current level or better, but through the new CAD system rather than a separate stand-alone system. This might delay the initial implementation of the Station Alerting system somewhat, but might result in a Station Alerting system that is better integrated with the new CAD system and may cost less in the long run.

Council staff recommends adding the following language in a new “Conditions” section of the PDF:

Functional requirements for the Station Alerting system must be included as part of the CAD Business requirements. The CAD procurement request must reflect the County’s interest in maintaining the Station Alerting functionality at the current level or better through the CAD system rather than through a stand-alone Station Alerting system.

Other (P-25 Radios): The Public Safety System includes a total of 6,372 radios. FY09 and FY10 federal grant funds are being used to purchase 747 upgraded radios, and the Park Police have 203 radios that are already P-25 compliant. A total of 5,422 radios remain to be replaced through the PSSM project at a total cost of \$22 million (approximate average unit cost \$4,075).

Upgrading to P-25 radios will be necessary for two reasons: 1) to maintain interoperability with other jurisdictions that are implementing new communications systems, and 2) the old, non P-25 radios will not work after the County’s radio infrastructure is replaced.

The Executive’s planned radio purchase is shown in the table below:

	FY11	FY12	FY13	FY14	FY15	FY16
P25 Radios \$ (in 000s)	2,500	5,900	7,828	5,860	0	0
# of Radios	614	1,448	1,942	1,438	0	0

Council staff recommends adjusting the schedule to slow the purchase of radios in FY11 and FY12 and shift the remaining radio schedule by one year from FYs 12-14 to FYs 13-15. This recommendation is suggested for fiscal reasons in FY11 and 12, and to allow time for radio infrastructure planning to occur before the majority of new radios are purchased. This approach will allow the purchase of some radios for replacements and to expand interoperable capability. At the same time, it may help avoid a situation in which radios purchased at the beginning of this project would need upgrades later to be compatible with the new radio infrastructure.

Council staff’s recommendation is shown in the table below.

	FY11	FY12	FY13	FY14	FY15	FY16
P25 Radios \$ (in 000s)	1,250	1,250	5,900	7,828	5,860	0
# of Radios	307	307	1,448	1,942	1,438	0

Appropriation: The Executive’s recommended PDF requests an appropriation of \$3.55 million in FY11, and shows an estimated appropriation request of \$18.57 million in FY12. ***Council staff recommends changing the FY11 appropriation to \$2.1 million in FY11 (to cover \$850,000 for planning and \$1.25 million for radios), and an estimated appropriation request of \$14.12 million to reflect Council staff recommendations for FY12.***

Council staff recommends adding the following language to the new “Conditions” section of the PDF to specify what the FY11 appropriation is for:

Funds appropriated for this project must be used as follows: Not more than \$300,000 for planning for public safety radio infrastructure replacement, \$550,000 for planning for CAD replacement, and \$1,250,000 for the purchase of P-25 compliant radios. Funds appropriated for this project must not be used to purchase or implement the replacement CAD system or radio infrastructure until the Executive provides the Council with a detailed proposal and accurate cost estimates for the total project scope.

Governance: This project is proposed as a General Government project in Technology Services with the Department of Technology Services as the Administering Agency. It is Council staff’s understanding that, as proposed, this project would be developed and implemented through a collaborative process involving the user departments, and led by the Department of Technology Services.

Council staff recommends using the governance structure for the Technology Modernization (Tech Mod) project instead. Under this model, the project would be shown as a General Government project in County Offices and Other Improvements, with the County Executive as the Administering Agency. While much about the project development process would presumably be the same – a collaborative process with DTS in the lead on the selection and implementation of the technology to be used, the County Executive would be the one to make policy decisions regarding the overall project cost, implementation of business process changes resulting from new technology, priorities for funding if there are conflicting requests, and the inclusion of outside agencies in the process.

Council staff recommends amending the top of the PDF as follows to indicate the use of the Tech Mod governance structure (Tech Mod PDF on © 10):

Category	General Government
Subcategory	County Offices and Other Improvements
Administering Agency	County Executive
Planning Area	Countywide

Systems included in CAD replacement: The table on © 2 indicates that the PSSM CAD replacement will include the eJustice Law Enforcement records management system. Several other systems currently interrelate with the CAD system including Firehouse records management, the Integrated Justice Information System (IJIS), and the electronic Patient Care Reporting system (ePCR). Executive staff told Council staff that the CAD replacement requirements will either require replacement or interfaces for these systems.

Council staff recommends adding text to the “Other” section of the PDF to state that eJustice will be replaced as part of the CAD replacement, and list the other systems that will be considered for replacement or interface with the new CAD. Examples of similar lists appear in the Radio Infrastructure Replacement summary on © 3 and the Fairfax contract information on © 5. Without such a list in the PSSM PDF, there may be confusion about what is included in the

CAD replacement project. If the Committees agree to recommend this, Council staff will work with Executive staff to provide the list.

Other changes to the PDF language: In addition to the PDF changes recommended above, *Council staff recommends the following additional changes to the PDF language to clarify what is included in the project.* (Additions are underlined; deletions are in brackets.)

Project Description, Paragraph 1

...A subsequent phase would include the replacement of the radio infrastructure, estimated at approximately \$50M. This project includes \$1.7M for planning and design of the radio infrastructure replacement.

Cost Change

Increase due to inclusion of additional upgrades and modernization of computer aided dispatch (CAD), replacement of mobile and portable radios, [and] planning for replacement of voice radio [systems] infrastructure, and addition of Fire Station Alerting project.

Fiscal Note, add to the end

Estimated costs for the elements to be funded in the current phase of the project are: CAD replacement \$23.34M; purchase of interoperable radios \$25.1M; Station Alerting system \$3.489M; planning for radio infrastructure replacement \$1.7 M.

<u>This packet contains:</u>	<u>circle #</u>
PDF with Council staff recommendations	1
Cost breakout of CE recommended project	2
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Council staff recommendations
(text changes are included in
packet memo)

Public Safety System Modernization -- No. 340901

Category
Subcategory
Administering Agency
Planning Area

General Government
~~Technology Services~~ County Offices + Impr.
~~Technology Services~~ County Executive
Countywide

Date Last Modified
Required Adequate Public Facility
Relocation Impact
Status

January 08, 2010
No
None.
On-going

EXPENDITURE SCHEDULE (\$000) 12,250 16,900 7,528

Cost Element	Total	Thru FY09	Est. FY10	Total 6 Years	FY11	FY12	FY13	FY14	FY15	FY16	Beyond 6 Years
Planning, Design, and Supervision	3,266	0	0	3,266	850	925	1,620	945	895	501	0
Land	0	0	0	0	0	0	0	0	0	0	0
Site Improvements and Utilities	0	0	0	0	0	0	0	0	0	0	0
Construction	3,264	0	0	3,264	0	125	850	725	1,345	1,069	0
Other	47,131	2,947	96	44,088	1,250	2,500	16,900	18,828	5,860	5,860	0
Total	53,661	2,947	96	50,618	2,100	3,550	18,570	21,068	7,450	5,860	0

FUNDING SCHEDULE (\$000) 14,120 19,140 9,398

Federal Aid	3,343	2,947	96	300	300	0	0	0	0	0	0
G.O. Bonds	3,840	0	0	3,840	200	1,000	800	1,420	1,420	0	0
Short-Term Financing	46,478	0	0	46,478	1,400	3,050	17,770	19,848	6,040	5,860	0
Total	53,661	2,947	96	50,618	2,100	3,550	18,570	21,068	7,450	5,860	0

OPERATING BUDGET IMPACT (\$000) 14,120 19,140 9,398

Maintenance				2,408	48	0	680	500	680	500	
Net Impact				2,408	48	0	680	500	680	500	

DESCRIPTION

This project will provide for phased upgrades and modernization of computer aided dispatch (CAD) and voice radio systems used primarily by the County's public safety first responder agencies including Police, Fire and Rescue, Sheriff, Corrections and Rehabilitation and Emergency Management and Homeland Security. The modernization will include replacement of the current CAD system, replacement of mobile and portable radios, and voice radio communications infrastructure. The initial phase includes the CAD replacement, station alerting system replacement and the acquisition of the P-25 standard radio devices. A subsequent phase would include the replacement of the radio infrastructure, estimated at approximately \$50M.

The previously approved Fire Station Alerting System Upgrades project (#451000) was transferred to this project in order to coordinate the upgrades with the new CAD system. The alerting system upgrades will modernize the fire station alerting systems at 32 existing stations, maintaining the ability to notify fire and rescue stations of emergencies. The alerting system, including audible and data signals, is essential for the notification of an emergency and the dispatch of appropriate response units from the county.

As voice, data and video are beginning to converge to a single platform, this project will provide a pathway to a modern public safety support infrastructure that will enable the County to leverage technology advances and provides efficient and reliable systems for first responders. This project will follow the methodologies and strategies presented in the Public Safety Systems Modernization (PSSM) plan completed in July 2009.

COST CHANGE

Increase due to inclusion of additional upgrades and modernization of computer aided dispatch (CAD), replacement of mobile and portable radios, and voice radio systems, and addition of Fire Station Alerting project.

JUSTIFICATION

The Public Safety Systems require modernization. The CAD system is reaching the end of useful life and does not meet the County's current operational requirements, impacting the response time of first responders to 9-1-1 calls. The CAD roadmap Study completed in March 2009, recommended replacement of the system to address existing shortcomings and prepare for the next generation 9-1-1 systems. Manufacturer's support for the voice radio system will begin to be phased out December 31, 2009. Beyond that date the manufacturer will only continue to provide system support on an "as available" basis, but will not guarantee the availability of parts or technical resources.

The CAD modernization will initiate with a detailed planning phase that will include the use of industry experts to assist in both business process analysis and developing detailed business and technical requirements for the new CAD system. Utilizing external consultants for this process will allow the County to incorporate lessons learned and best practices from other jurisdictions.

The fire station alerting system upgrades were identified as a need under Section 5 of the MCFRS Master Plan (adopted by the County Council in October 2005) and detailed in the Station Alerting and Public Address (SA/PA) System for Fire/Rescue Stations, Rev 1, 2006. This project allows for the continuous and seamless functioning of the alerting systems within each fire station. A preliminary survey by DTS of existing conditions at all stations revealed system wide

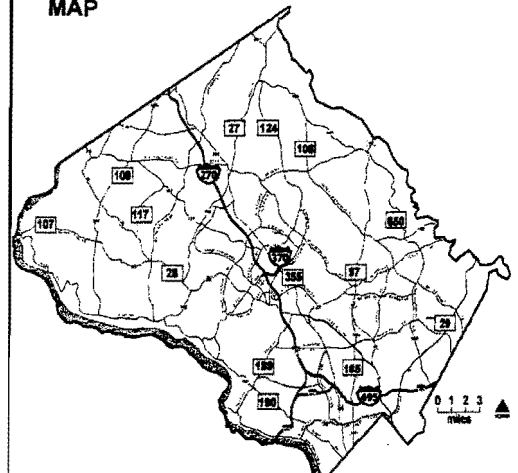
APPROPRIATION AND EXPENDITURE DATA

Date First Appropriation	FY09	(\$000)
First Cost Estimate	FY11	53,661
Current Scope		
Last FY's Cost Estimate		6,883
Appropriation Request	FY11	2,100,350
Appropriation Request Est.	FY12	14,120,670
Supplemental Appropriation Request		0
Transfer		0
Cumulative Appropriation		3,043
Expenditures / Encumbrances		2,947
Unencumbered Balance		96
Partial Closeout Thru	FY08	0
New Partial Closeout	FY09	0
Total Partial Closeout		0

COORDINATION

Public Safety Steering Group
Department of Technology Services
Department of Police
Montgomery County Department of Fire and Rescue Service
Sheriff's Office
Department of Corrections and Rehabilitation
Office of Emergency Management and Homeland Security
Department of Transportation
Department of Liquor Control
Montgomery County Public Schools (MCPS)
Maryland-National Park and Planning Commission (M-NCPPC) Park Police
Washington Metropolitan Area Transit Authority (WMATA)

MAP



CIP 2011-2016 (\$000s)								
		2011	2012	2013	2014	2015	2016	Total
Radio	Infrastructure Planning \$	\$ 300	\$ 450	\$ 450	\$ 501	\$ -	\$ -	\$ 1,701
	P25 Radios \$	\$ 2,500	\$ 5,900	\$ 7,828	\$ 5,860	\$ -	\$ -	\$ 22,088
	# of Radios	614	1,448	1,922	1,438	-	-	5,422
CAD	Planning \$	\$ 550	\$ 420	\$ 370	\$ -	\$ -	\$ -	\$ 1,340
	Procurement \$	\$ -	\$ 9,000	\$ 9,000	\$ -	\$ -	\$ -	\$ 18,000
	Deployment \$	\$ -	\$ 2,000	\$ 2,000	\$ -	\$ -	\$ -	\$ 4,000
Station Alerting	Planning \$	\$ 75	\$ 75	\$ 75	\$ -	\$ -	\$ -	\$ 225
	Construction \$	\$ 125	\$ 725	\$ 1,345	\$ 1,069	\$ -	\$ -	\$ 3,264
	# of Stations	1	7	13	11	-	-	32
Total		\$ 3,550	\$ 18,570	\$ 21,068	\$ 7,430	\$ -	\$ -	\$ 50,618

Future CIP add-on (\$000s) <i>see Radio Infrastructure Plan</i>								
		2011	2012	2013	2014	2015	2016	Total
Radio	Software \$	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Infra-structure	Electronics \$	\$ -	\$ -	PDF cross reference to line # above Planning = 1, 4, 7 Construction = 8 Other = 2, 5, 6				\$ -
	3 towers \$	\$ -	\$ -					\$ -
	Total	\$ -	\$ -					\$ -
MDTs								

Ruggedized Laptops used for mobile data terminals (MDTs) have a lifespan of 4-5 years, and given the large fleet of MDT's, an ongoing replacement of one fourth or one fifth of the inventory annually is recommended. The total inventory of MDT's is approximately 1,600 units, replacing one fourth requires an estimated funding of \$1.6M annually. In past years, the County was successful in obtaining grant funding for some replacements.

ePCR

Tablets recently acquired for electronic patient care reporting (ePCR) are expected to have a 3-4 year lifespan. Given the smaller inventory, approximately 150 units, tablets could be replaced all at once. Replacing all ePCR tablets requires an estimated funding of \$600K.

In-Car-Video

The video equipment lifespan is expected to 5-6 years. However, this type of equipment is new to the public safety environment and the County has only limited operational experience.

eJustice

eJustice, the Law enforcement records management system (RMS) was acquired in 2004 has an expected lifespan of 7-9 years. The PSSM CAD replacement requirements will include an integrated law enforcement RMS.

Firehouse

The Firehouse RMS was implemented in 2003 and has an expected lifespan of 7-9 years. Replacement timing is to be determined. The replacement cost is estimated to be \$500K.

NextGen9-1-1

Since the NextGen9-1-1 standards are not finalized and the networks are not fielded, it is premature to determine budget impacts. However, please note that 9-1-1 Telephony upgrades are usually funded from the 9-1-1 service fee through the Maryland Emergency Systems Board (ENSB) and do not impact the County operating or capital budgets. The County's 9-1-1 Systems were just recently upgraded through the ENSB and the County's 9-1-1 systems are positioned to connect to a NextGen9-1-1 network once fielded.

VoicePrint

VoicePrint was upgraded in 2009 with USAI grant funds and the 9-1-1 service fee through the Maryland Emergency Systems Board (ENSB). The Voiceprint lifespan is expected to be 4-5 years and the estimated replacement cost estimate is \$250K. The next upgrade is anticipated to be funded by a combination of the Radio infrastructure CIP and 9-1-1 service fee.

Radio Infrastructure Modernization Plan summary:

NOTE: The assumptions below assumes the purchase of a Motorola SmartX System solution that enables Montgomery County to implement an ASTRO 25 Master Site and slowly migrate non-P-25 subscriber radios and RF Sites to P-25 over time. Substantial savings are realized through re-use of existing components. Here is a listing of some of the major hardware components:

Current Equipment that can be re-used on replacement system:

- Existing antennas, towers, shelters and power systems
- Network Back-bone: Microwave and Fiber
- CENTRACOM Gold Elite Consoles: (Requires IP Gateway and software Upgrade)
- Any prior purchased P-25 Capable Subscriber Radios

Current Equipment requiring replacement:

- Zone Controllers
- Network Management Controllers
- Simulcast Controllers
- Remote RF Site Controllers
- Quantar Base Stations
- ASTROTAC Comparators
- Non-P-25 Capable Subscriber Radios

Current Equipment no longer required:

- Central Electronics Bank
- Digital Interface Units
- Channel Banks

Year One Implementation (Radio Infrastructure)	Year Two Implementation
Phase II	Phase IV (60%)
Phase III	Phase V
Phase IV (40 %)	

Estimated Budgetary Pricing for Infrastructure Upgrade:

Phase	Cost	Scope
Phase I	\$ 25,131,000	Purchase P-25 Portable and Mobile Subscriber Radios
		This phase migration replaces all non P-25 subscriber radios and should continue prior to infrastructure replacement. This allows a spread out of cost and reduces a one time budgetary impact. This subscribers conversion to P-25 capability will continue to maintain/increase the interoperability capabilities with the surrounding counties and the National Capital Region. Purchased 747 radios in FY10 with grant funds. Total number of portable and mobile radios is 6,269.

Phase	Est Low Cost	Est High Cost	Scope
Phase II	\$ 4,500,000	\$ 5,500,000	Implement P-25 Master Site, Gold Elite Interface and Gateway Converter
			This phase replaces the existing zone controller and network core. It begins the network conversion from a circuit based system to an IP based network. The Gateway Converter translates Astro 3.0 audio and control packets to P-25 compliant packets
Phase III	\$ 2,000,000	\$ 3,000,000	Construct New RF Tower(s) or Rooftop Sites
			This phase deploys new RF towers and/or rooftop sites as needed to improve coverage in specific parts of the county. (3-4 sites)
Phase IV	\$ 31,500,000	\$ 38,500,000	Implement 20 Channel P-25 Simulcast Prime Site and all RF Sites
			This phase replaces the existing 20 channel Astro 3.0 repeaters and simulcast equipment with new P-25 repeaters and control equipment
Phase V	\$ 3,150,000	\$ 3,850,000	Implement Redundant Prime Site
			This phase adds a redundant prime site to maintain a high level of system availability in the event the main prime site is disabled.

Phase II - V \$ 41,150,000 \$ 50,850,000

Noted in the PSSM PDF #340901.

COUNTY EXECUTIVE - FY11 - 16 CIP SUBMISSION REQUESTS

Project Name:	Public Safety System Modernization (PSSM) - 341101 (\$000's) (incl. Fire Station Alerting)									
	Total	Thru FY10	6 Years	FY11	FY12	FY13	FY14	FY15	FY16	Beyond 6 Years
CAD System	23,340	-	23,340	550	11,420	11,370	-	-	-	-
Station Alerting	3,489	-	3,489	125	725	1,345	1,069	-	-	-
StationAlerting - PIng				75	75	75				
Radio Units	25,131	3,043	22,088	2,500	5,900	7,828	5,860	-	-	-
Radio Infra. PIng	1,701	-	1,701	300	450	450	501	-	-	-
Radio Infrastructure	-	-	-	-	-	-	-	-	-	-
Total PSSM	53,661	3,043	50,618	3,550	18,570	21,068	7,430	-	-	-

INFORMATION - 2

Contract Award – Computer Aided Dispatch and Records Management Systems for Fairfax County Public Safety Agencies

On April 5, 2006, the Department of Purchasing and Supply Management issued Request for Proposal RFP06-854705-10 on behalf of the Public Safety Information Technology Governance Board, soliciting offers from pre-qualified sources to provide Computer Aided Dispatch and Records Management Systems for Fairfax County. The Department of Information Technology provides Executive Management of this Project.

Services provided under this contract will include hardware, software, services (including implementation and training) and consulting for a new integrated public safety systems architecture including the following applications and their ancillary systems:

- Computer Aided Dispatch (CAD) System and CAD Mobile Application
(Replacement of Altaris)
- Law Enforcement Records Management System (LERMS)
(Replacement of a 23 year old home-grown mainframe system)
- Integrated Law Enforcement Field Reporting System
(New System)
- Fire Emergency Medical Services Incident Reporting (EMSIR)
(New System)
- Fire Records Management System (Fire RMS)
(Expansion of existing system)
- Integrated Fire Mobile Reporting with Tactical Command System
(New Systems)

The approach taken with this multi-phased, multi-disciplinary project has been built through ground-up organizational input and direct involvement of all the public safety agencies, the Department of Public Safety Communications, the Police Department, the Fire and Rescue Department, Office of the Sheriff and the Office of Emergency Management with Executive Project Management from DIT. Best practices, including organizational focus on the mission, cross-functional project team identification, involvement of project sponsors and stakeholders, and iterative review of lessons learned in past projects have been applied in every stage of the project and will continue to guide development and implementation and training over the coming 33 month project period. The CAD/RMS Project Steering Committee has been in place since April 2005 to facilitate input and coordination with end users at the lowest levels within the public safety agencies, and it answers to and takes policy guidance from the Public Safety IT Governance Board, which is composed of Deputy County Executives, Director of Department of Public Safety Communication the Police Chief, the Fire Chief, the Sheriff and the Director of the Office of Emergency Management. Input from every organizational component of the agencies was solicited and verified as part of the extensive requirements development process. As a result more than 3,500 requirements have been defined, verified and vetted through the vendor qualification, solicitation, evaluation and selection processes. These requirements form the

backbone of the functional performance specifications for the project and will be validated at each step of the implementation.

The Computer Aided Dispatch System will serve as the core of this integrated, comprehensive public safety information management system, seamlessly sharing core event data with integrated records management systems and providing a platform to deliver information to operational forces in the field through the CAD mobile. The County has conducted a procurement process, starting with development of comprehensive, multi-agency requirements development, followed by a Request for Qualifications (RFQ), and issuance of an RFP. A rigorous evaluation of the proposals, with input from all stakeholder groups, was conducted in order to obtain a highly configurable, standards-based, integrated state-of-the-art solution with a proven track record. The public safety agencies are committed to implementing products that have not only a track record of performance, but that also have a future life cycle supported by vendor commitment to research and development as well as to strong User Group input for product growth and enhancement. Leveraging this shared infrastructure and architecture, the County will be able to achieve cost effectiveness as well as application and agency operational efficiencies.

This project will provide the County's public safety first responders with ready access to the tools that will enable sharing of tactical information, often in real time and on-site, with a number of different entities such as emergency management agencies; neighboring Public Safety Answering Points and Police and Fire departments; as well as state and federal authorities including Department of Defense components. These requirements are particularly critical for the County and other jurisdictions in the National Capital Region (NCR). Since the initial stages of this project, coordination has been ongoing with the region's public safety agencies as well as Virginia Department of Transportation and Virginia State Police, who are partners in the Public Safety and Transportation Operations Center. The Metropolitan Washington Council of Governments rider is proposed for this contract to enable other jurisdictions to take advantage of the County's procurement initiative and acquire services and technology that would enhance interoperability in the region.

There are numerous technical and functional improvements a new system will offer the County, and many are considered "baseline" products in current generation CAD and RMS applications. This new solution will include the following essential technical improvements:

- Integrated CAD/Records Management System for Police and Fire and Rescue - The current Police Records Management System is twenty years old, not integrated with CAD, and well past normal life cycle replacement. It does not support modern law enforcement and crime analysis activities. .
- Automatic Vehicle Location (AVL) – The current CAD does not support GPS technology and applications to track the locations of public safety units. This is a vital feature to insure personnel safety, as well as operational capabilities such as nearest unit response and appropriate resource utilization.

- Nearest Unit Response – The CAD application manages input from Global Positioning Systems (GPS) to track unit locations and employs programming logic to recommend the nearest, most appropriate units based on the status and capabilities of the units. These features will enable public safety agencies to move from a fixed area response scheme to deployments based on response-based criteria. More than 18 months ago, the County's Geospatial Information Systems personnel in DIT and the public safety agencies began evaluating requirements to support this new method of operation. Efficient routing based on quality mapping data, in combination with AVL will provide the fastest response to the scene and insure that the closest, most appropriate unit is provided with the optimal routing. In a parallel activity, funded under the NCR Urban Areas Security Initiatives (UASI), the region's CAD managers and fire operations personnel are examining data exchange capabilities to support nearest unit response across jurisdictional lines where it is supported by existing operational agreements.
- Standards Based GIS Capability that will integrate with and leverage existing County GIS data layer and mapping resources – Geographically represented data and information is essential to all public safety agencies, for both after action and statistical reporting, and for on-scene response and incident management. Integrated standards based GIS capabilities will enable the county to leverage technology resources and skill sets across the enterprise and increase efficiency.
- Standards based interoperability to support both internal county data and information sharing across public safety and related agencies, as well as critical external data and information sharing such as CAD to CAD for more effective collaborative incident response with neighboring jurisdictions supporting mutual response. In addition to operational data sharing, these integrated, standards based applications will support for data exchange to meet administrative needs. For example, the EMS patient care application will capture and share data for EMS transport billing, thus improving timeliness of billing as well as accuracy, integrity and security of billing information.
- Up-to-date tools that improve system administration, enabling the county to better manage and own its application and increasing the ability for Public Safety to respond quickly and effectively to changing needs, and reducing reliance on third-party support and overall system maintenance costs.
- A non-proprietary, standards based system architecture built on a standard platform that reduces the frequency of costly and invasion forklift replacements based on hardware obsolesce. This improves the county's posture for planning refresh cycles into warranties and maintenance plans.

The training requirements for this project are significant, and significant costs within this project are directed at provision of training by the contractor. The public safety agencies also plan to direct resources toward end user training, with each agency taking a unique approach tailored for the service. The Statement of Work for this project specifies that, within the first 3 months of project operations, the contractor will provide expert training resources to work with the CAD/RMS Project Team and key

training resources in public safety and DIT to develop a comprehensive plan for timely, effective training for every component of this CAD/RMS implementation.

RFP06-854705-10 was publicly advertised and notice was directly sent to six (6) pre-qualified vendors. Three (3) firms submitted proposals. A Selection Advisory Committee (SAC) was formed and comprised of representatives from the County's Police Department, Fire and Rescue Department, Department of Public Safety Communications, Sheriff's Office, Office of Emergency Management and Department of Information Technology. The SAC evaluated the proposals in accordance with the criteria and procedures established in the RFP.

Upon completion of final evaluation and negotiations with the top rated offeror, the SAC recommended award of the contract to Intergraph Public Safety Systems.

The Fairfax County Department of Tax Administration has verified that Intergraph Corporation does not require a Fairfax County Business, Professional & Occupational License (BPOL).

Unless otherwise directed by the Board of Supervisors, the County Purchasing Agent will proceed to award this contract to Intergraph Corporation to provide implementation of computer aided dispatch and records management systems for Fairfax County public safety agencies.

FISCAL IMPACT:

This project replaces the following legacy systems:

- Computer Aided Dispatch (CAD) System and CAD Mobile Application Replacement (replacing Altaris) -- Currently estimated at \$9.4 million
- Law Enforcement Records Management System (LERMS) Replacement (replacing antiquated mainframe system, Police Records Management System) – Currently estimated at \$8.8 million*

This project provides the following enhancements:

- Fire Records Management System (implementation of additional modules and integration with EMS application for improved patient care record-keeping and billing) – Currently estimated at \$2.4 million **

Finally, this project will result in the following new capabilities:

- Mobile Application for Fire Records with Tactical Command component – (included as part of Fire Records Management System, above**)
- Field Reporting for Law Enforcement (included as part of LERMS, above*)
- Emergency Medical Services Patient Care Reporting System – Currently estimated at \$2.7 million

All of these components will be implemented on a shared platform with a shared secure infrastructure.

The amount of the contract is \$23.3 million distributed over a thirty-three month implementation period. The FY 2008 Adopted budget includes \$14.3 million for the first

phases of the contract, from existing appropriations in Fund 104, Information Technology Fund and Fund 312, Public Safety Construction. Additional funding of \$9 million will be requested from the Board of Supervisors in the FY 2009 and FY 2010 Budget processes to complete future phases of this extensive project to modernize and enhance the essential public safety information architecture. When completed, this project will replace, upgrade or enhance the critical systems used by Fairfax County's public safety agencies and will result in increased integration among the systems to improve efficiency of the field forces and improve services to County residents.

ENCLOSED DOCUMENTS:

Attachment 1 - List of Offerors for RFP07-860414-10

STAFF:

Edward L. Long, Deputy County Executive
David J. Molchany, Deputy County Executive
Robert A. Stalzer, Deputy County Executive
Cathy A. Muse, Director, Department of Purchasing and Supply Management
Wanda L. Gibson, Director, Department of Information Technology
Dinese F. Drake, Project Manager, Department of Information Technology

Technology Modernization -- MCG -- No. 150701

Category
Subcategory
Administering Agency
Planning Area

General Government
County Offices and Other Improvements
County Executive
Countywide

Date Last Modified
Required Adequate Public Facility
Relocation Impact
Status

January 11, 2010
No
None.
On-going

EXPENDITURE SCHEDULE (\$000)

Cost Element	Total	Thru FY09	Est. FY10	Total 6 Years	FY11	FY12	FY13	FY14	FY15	FY16	Beyond 6 Years
Planning, Design, and Supervision	80,209	19,745	32,659	27,805	17,095	10,710	0	0	0	0	0
Land	0	0	0	0	0	0	0	0	0	0	0
Site Improvements and Utilities	0	0	0	0	0	0	0	0	0	0	0
Construction	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0
Total	80,209	19,745	32,659	27,805	17,095	10,710	0	0	0	0	0

FUNDING SCHEDULE (\$000)

Current Revenue: General	42,086	14,524	10,802	16,760	11,462	5,298	0	0	0	0	0
Land Sale	2,634	2,634	0	0	0	0	0	0	0	0	0
Short-Term Financing	35,489	2,587	21,857	11,045	5,633	5,412	0	0	0	0	0
Total	80,209	19,745	32,659	27,805	17,095	10,710	0	0	0	0	0

OPERATING BUDGET IMPACT (\$000)

Maintenance				37,573	6,036	8,527	11,336	11,674	0	0
Productivity Improvements				-20,000	0	0	-5,000	-15,000	0	0
Net Impact				17,573	6,036	8,527	6,336	-3,326	0	0

DESCRIPTION

This project provides for the replacement, upgrade, and implementation of IT initiatives that will ensure ongoing viability of key processes, replace outdated and vulnerable systems, and produce a high return in terms of customer service and accountability to our residents. Major new IT systems being launched through this project are Enterprise Resource Planning (ERP), 311/Constituent Relationship Management (CRM), and related Business Process Review (BPR). ERP will modernize our Core Business Systems to improve the efficiency, effectiveness, and responsiveness of the County Government. The ERP project will provide needed upgrades to the County's financial, procurement, human resource, and budgeting systems and will streamline existing business processes. Business Process Review is occurring as part of ERP requirements analysis and planning. The first phase of this project, MCtime, the implementation of electronic time reporting, is well underway. A new 311/CRM system will combine advanced telephony, internet, and computer technology with constituent-focused business processes. Residents will ultimately be able to call one number to access County government services and built-in tracking and accountability features will assure that every call receives a timely response. Completion of Phase I of the current MC311 (CRM) will include developing an automated service request processing system for the County's Department of Transportation including converting the systems currently used for leaf pick-up, snow removal, tree issues, and street light outages.

JUSTIFICATION

According to a 2004 ranking of major existing technology systems based on their current health and relative need for upgrade or replacement, the County's current core business systems (ADPICS, FAMIS, BPREP, and HRMS) were ranked as Priority #1, which means "obsolete or vulnerable critical system in immediate risk of failure." These at-risk systems will be replaced with a state of the art ERP system which will provide a common database supporting financials, procurement, budget, and HR/payroll, and will include system-wide features for security, workflow, and reporting, and up-to-date technology architecture. Montgomery County seeks to set a national standard for accountability and responsiveness in governance and the delivery of services to its residents and businesses. A customer-oriented 311/CRM system is needed as a single one-stop-shop phone number and intake system to meet this growing demand. The current cost estimate is based on detailed review of integrator, staffing, hardware, and software costs.

Information Technology Interagency Funding and Budgeting Committee's report of September 30, 2003.

MCG FY06 IT Budget Overview prepared by DTS.

OTHER

The Technology Modernization - MCG project has been intended to serve as an ongoing resource for future IT modernization to the County Government's business systems beyond the currently defined project scope. Future projects may include the following:

CRM

Phase II: This initiative will extend the service to municipalities in the County, and other County agencies (e.g. Board of Education, M-NCPPC, Montgomery College). This initiative will proceed based upon interest from these organizations and agreement on funding.

Creation of a Citizen Relationship Management (CRM) program which will develop or convert automated capabilities for all appropriate County services

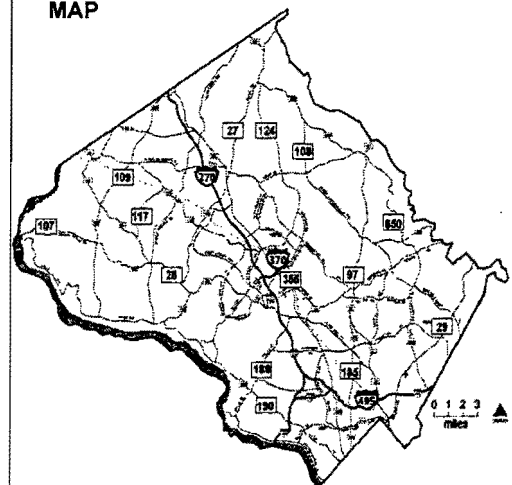
APPROPRIATION AND EXPENDITURE DATA

Date First Appropriation	FY07	(\$000)
First Cost Estimate	FY08	85,464
Current Scope		
Last FY's Cost Estimate		80,209
Appropriation Request	FY11	11,462
Appropriation Request Est.	FY12	4,538
Supplemental Appropriation Request		0
Transfer		0
Cumulative Appropriation		64,209
Expenditures / Encumbrances		51,019
Unencumbered Balance		13,190
Partial Closeout Thru	FY08	0
New Partial Closeout	FY09	0
Total Partial Closeout		0

COORDINATION

MCG efforts must be coordinated with the recent implementation of a new Financial Management System by MCPS and efforts by other agencies to ensure data transportability and satisfy reporting needs between agencies. Project staff are drawing on the implementation experiences of MCPS, WMATA and governments with functions and components similar to MCG during the project planning, requirements gathering, and requests for proposal (RFP) phases. Offices of the County Executive
Office of the County Council
Department of Finance
Department of Technology Services
Office of Procurement
Office of Human Resources
Office of Management and Budget
All MCG Departments and Offices

MAP



Technology Modernization -- MCG -- No. 150701 (continued)

including:

Case Management
Events Management
Field Services
Grants Management
Help Desk Solutions
Point of Sales
Resident Issue Tracking System
Work Order Processing System

ERP

Business Intelligence/Data Warehouse Development
Loan Management
Property Tax Billing and Collection
Public Access to Contractor Payments
Upgrade to Oracle E-Business/Kronos/Siebel
Enhancements to comply with evolving Payment Card Industry (PCI) mandates

FISCAL NOTE

Project funding includes short-term financing for integrator services and software costs. Operating Budget Impact revised in FY13 and FY14 to reflect Council productivity targets.

MEMORANDUM

February 18, 2010

TO: Management and Fiscal Policy Committee
Public Safety Committee

FROM: Dr. Costis Toregas, Council IT Adviser *CT*
Minna K. Davidson, Legislative Analyst *MKD*

SUBJECT: FY11-16 Capital Improvements Program: Public Safety System Modernization

Executive's Recommendation

For FY11-16, the Executive recommends \$53.7 million for a Public Safety System Modernization Project. The Executive's recommendation would fund three elements of the modernization: 1) replacement of the Computer Aided Dispatch (CAD) system; 2) replacement of the fire station alerting system (formerly a separate CIP project that has been incorporated into this project); 3) acquisition of P-25 standard radio devices. A subsequent phase of the project would include replacement of the radio infrastructure, estimated at an additional \$50 million. The current project includes \$1.8 million to plan for the radio infrastructure phase. The current project is recommended to be funded with a combination of \$3.3 million in Federal Aid, \$3.8 million in GO bonds, and \$46.5 million in short-term financing. The Executive's recommended PDF for this project is attached on © 1-2. Executive staff responses to Council staff questions are on © 3-10.

Project Justification

The MFP and PS Committees have been receiving updates on the Public Safety System (PSS) for the past several months. The Committees have been told that the CAD system is approaching the end of its useful life and does not meet all of the needs of the user departments. The Public Safety Radio System is near the end of its factory support period (manufacturer's support was to begin to be phased out on December 31, 2009), and interoperability issues are arising as some neighboring jurisdictions replace older radio systems with 700 MHz systems.

In July 2009, the Committees reviewed three reports on the public safety systems. Major recommendations from the reports are summarized in the paragraphs below, and excerpts from the reports are attached as indicated.

Montgomery County Public Safety Systems Modernization Plan, July 2009. This report approaches the replacement of the PSS from an enterprise perspective. It includes a thorough inventory of the technology applications and architecture supporting public safety communications and related functions, discusses future strategies, and suggests next steps. In general, it supports the findings and recommendations of the two studies listed below. The Introduction and Next Steps sections from the PSS Modernization Plan are attached on © 13-16. The full report is available at:

http://www.montgomerycountymd.gov/content/council/pdf/agenda/cm/2009/090723/20090723_PSMFP1-1.pdf.

Montgomery County Communications Interoperability Plan, July 2009. This report examines local and regional interoperability partners, issues affecting interoperability, and the County's current infrastructure. It concludes that the County's voice radio system must be upgraded/replaced in the near future, and suggests a phased implementation over a five-year period (See table on © 20-21.) The Executive Overview of this plan is attached on © 17-21. Comments on project planning, including estimated ballpark costs, are on © 22. Background on the P-25 standard is on © 23-25. The full report is available at:

http://www.montgomerycountymd.gov/content/council/pdf/agenda/cm/2009/090723/20090723_PSMFP1-2.pdf.

Montgomery County Computer Aided Dispatch Roadmap Study, March 23, 2009. This report identifies business needs that are not being met by the current CAD system, makes recommendations for replacing the current CAD system, and provides guidance for extending the useful life of the current CAD system until a new CAD is operational. The study recommends that the County begin the process of selecting and implementing a new CAD system immediately. The Executive Summary is attached on © 26. A Future CAD System Cost Analysis and the study Recommendations are attached on © 27-32. The full report is available at:

http://www.montgomerycountymd.gov/content/council/pdf/agenda/cm/2009/090723/20090723_PSMFP1-3.pdf.

Committee Review

Although the reports listed above provide a good foundation for undertaking a PSS modernization, they do not provide many specifics about the system to be purchased, related costs, or the overall schedule for the replacement of all the system elements. While the PDF provides an overview of the recommended project and costs, it also does not provide much detail about what will be purchased, or how expenditures will break out.

Council staff is concerned that the Committees do not yet have enough information to develop a recommendation to the Council. The discussion below highlights issues that require further clarification.

Issues

1. **Recommended costs/expenditures:** The Executive is recommending a very costly project, but has provided very little detail about how the money will be expended. The PDF shows how expenditures will be allocated in certain categories over the six-year CIP period, but does not show how the expenditures apply to the three elements of the project. (Council staff would note that the PDF categories, which are generally intended for facility or road construction, are not as helpful for understanding expenditure allocations in technology projects.) The table provided by Executive staff on © 9 shows how the funds will be allocated for the three project elements, but does not indicate what the funds will be used for within each element.

With the information provided so far, it is difficult to tell which costs are included in the project, and which costs are not. For example, the Executive responses indicate that initial training costs for the CAD have been factored into the implementation costs of the systems, and training costs for the new radios are included in the CIP. For both types of training, it is not clear what amount is budgeted, or in which year it appears in the expenditure schedule.

Council staff comment: The Committee may want to request that Executive staff provide a more detailed breakout of the yearly expenditures in this project.

2. **Context for this expenditure:** As is noted in the PDF, the FY11-16 project will fund only three elements of a large system. An additional expenditure of \$50 million is anticipated to replace radio infrastructure, and it is unclear whether other expenditures will be needed later to replace or upgrade other parts of the system. It would be helpful to understand the total costs involved in modernizing the PSS. Council staff tried to get at this issue by asking Executive staff to complete the table on © 11. Executive staff sent the table on © 9 which deals with the current project but does not provide information about other phases of the modernization.

Council staff comment: The Committee may want to request that Executive staff complete the table on © 11.

3. **Future replacements:** The PSS includes several types of equipment for individual users or vehicles such as MDTs, ePCR tablets, and Police in-car video equipment. The response to question 8 on © 5 gives best practices life cycles for each type of equipment, but does not show an actual replacement schedule for the equipment. It also says that funding for future replacements will have to be identified.

Council staff comments: Council staff remains concerned that there is not a replacement schedule or funding plan for this equipment. In the past, funding for replacements has been piecemeal at best using grant monies or departmental funding as it becomes available. Replacement of this equipment will be an ongoing cost, and there should be a multi-year schedule showing the number of units to be replaced each year and the

associated costs. Even if replacements are funded through the operating budget, the Council should have this information to understand the full cost of the PSS.

4. **Operating Budget Impacts:** The operating Budget Impacts in the PDF show that a total of \$2.4 million will be required for maintenance of the new system over the six-year CIP period. The Executive staff response on © 6 says that the maintenance cost includes software maintenance with 7x24 support for the CAD system, and that other additional operating costs have not been identified.

Council staff comments: The Committee may want to discuss with Executive staff whether there are likely to be other additional operating costs, and if so, what they would be for, how much they would be, and when they would be identified.

5. **Radio purchase vs. infrastructure replacement:** Following the recommendations of the Communications Interoperability Plan, the Executive recommends replacing the existing voice radio units with P-25 standard radios before replacing the radio system infrastructure. (Background on the P-25 standard is on © 23-25.) A breakout showing the units to be replaced and their costs is on © 10. The Interoperability Plan recommends this approach because other surrounding jurisdictions are already upgrading to different radio systems, and purchasing P-25 radios will ensure that Montgomery County remains interoperable with the other jurisdictions.

While this approach is practical from an interoperability standpoint, Council staff is concerned because the factory support period for the radio infrastructure is ending soon, and it is not clear how vulnerable the system will be to service interruptions as factory support is withdrawn. In addition, it is not clear whether radios purchased before the infrastructure is designed and purchased will be compatible with the infrastructure that is delivered.

Council staff comments: The Committee may want to ask Executive staff to discuss the rationale for purchasing the P-25 radios before purchasing the radio infrastructure, how well the existing infrastructure is expected to perform as factory service is phased out, and whether there are likely to be any compatibility issues between new radios and new infrastructure if the radios are purchased first.

6. **Governance:** This project is a collaborative effort between the key public safety Departments and the Department of Technology Services. Much of the work is being done by the PSSM workgroup whose membership is listed on © 12. From the information provided, it is not clear who has the ultimate decision-making authority if there are conflicts among user departments, or if the program must be adjusted to stay within budget.

Council staff comments: Another large project, Tech Mods, is managed by the CAO's Office with the advantage that the CAO or his designee can prioritize requests from user departments and make final determinations when issues are in contention. In Council staff's view, the Tech Mods management model would also be appropriate for the PSSM

project. However, the Executive does not intend to use the Tech Mods model for this project. Council staff recommends that the Committees ask Executive staff to discuss the governance model for this project, and clarify who will have final decision-making authority and how conflicts will be resolved.

7. **Input from all users:** PSS users include the major County public safety departments plus some outside agencies including municipal police departments and Park Police. A list of users is attached on © 14. The Executive staff response to a question about input from outside organizations appears to say that they are included in the PSSM Work Group, but no representatives from outside organizations are on the PSSM membership list on © 12.

Council staff comment: The Committee may want to ask Executive staff to clarify how user organizations outside of County Government will have input into the PSSM project.

8. **Short-term financing:** The Executive recommends short term financing to fund \$46.5 million for this project. Although the exact financing mechanism has not been determined yet, the Executive estimates that the interest rate will be 5.0%. The payback would begin in FY12 and continue over six years with the following estimated schedule.

Year	Payback Amount
FY12	\$1.1 million
FY13	7.6 million
FY14	14.7 million
FY15	15.8 million
FY16	9.3 million
FY17	2.2 million
Total payback	\$50.7 million

Council staff comment: The Committee may want to ask when a determination will be made about the short term financing mechanism to be used, and whether the interest rate is likely to change before a financing arrangement is finalized.

This packet contains:

circle #

Executive's recommended FY11-16 PSSM PDF	1
Responses to Council staff questions	3
Expenditure schedule by project element	9
Radio Upgrade and Modernization Schedule	10
Sample table for Master Schedule	11
Excerpts, Public Safety Systems Modernization Plan	12
Excerpts, Communications Interoperability Plan	17
Excerpts, CAD Roadmap Study	26
Approved FY09-14 PSSM PDF	33

Public Safety System Modernization -- No. 340901

Category
Subcategory
Administering Agency
Planning Area

General Government
Technology Services
Technology Services
Countywide

Date Last Modified
Required Adequate Public Facility
Relocation Impact
Status

January 08, 2010
No
None.
On-going

EXPENDITURE SCHEDULE (\$000)

Cost Element	Total	Thru FY09	Est. FY10	Total 6 Years	FY11	FY12	FY13	FY14	FY15	FY16	Beyond 6 Years
Planning, Design, and Supervision	3,266	0	0	3,266	925	945	895	501	0	0	0
Land	0	0	0	0	0	0	0	0	0	0	0
Site Improvements and Utilities	0	0	0	0	0	0	0	0	0	0	0
Construction	3,264	0	0	3,264	125	725	1,345	1,069	0	0	0
Other	47,131	2,947	96	44,088	2,500	16,900	18,828	5,860	0	0	0
Total	53,661	2,947	96	50,618	3,550	18,570	21,068	7,430	0	0	0

FUNDING SCHEDULE (\$000)

Federal Aid	3,343	2,947	96	300	300	0	0	0	0	0	0
G.O. Bonds	3,840	0	0	3,840	200	800	1,420	1,420	0	0	0
Short-Term Financing	46,478	0	0	46,478	3,050	17,770	19,648	6,010	0	0	0
Total	53,661	2,947	96	50,618	3,550	18,570	21,068	7,430	0	0	0

OPERATING BUDGET IMPACT (\$000)

Maintenance				2,408	48	0	680	500	680	500
Net Impact				2,408	48	0	680	500	680	500

DESCRIPTION

This project will provide for phased upgrades and modernization of computer aided dispatch (CAD) and voice radio systems used primarily by the County's public safety first responder agencies including Police, Fire and Rescue, Sheriff, Corrections and Rehabilitation and Emergency Management and Homeland Security. The modernization will include replacement of the current CAD system, replacement of mobile and portable radios, and voice radio communications infrastructure. The initial phase includes the CAD replacement, station alerting system replacement and the acquisition of the P-25 standard radio devices. A subsequent phase would include the replacement of the radio infrastructure, estimated at approximately \$50M.

The previously approved Fire Station Alerting System Upgrades project (#451000) was transferred to the this project in order to coordinate the upgrades with the new CAD system. The alerting system upgrades will modernize the fire station alerting systems at 32 existing stations, maintaining the ability to notify fire and rescue stations of emergencies. The alerting system, including audible and data signals, is essential for the notification of an emergency and the dispatch of appropriate response units from the county.

As voice, data and video are beginning to converge to a single platform, this project will provide a pathway to a modern public safety support infrastructure that will enable the County to leverage technology advances and provides efficient and reliable systems for first responders. This project will follow the methodologies and strategies presented in the Public Safety Systems Modernization (PSSM) plan completed in July 2009.

COST CHANGE

Increase due to inclusion of additional upgrades and modernization of computer aided dispatch (CAD), replacement of mobile and portable radios, and voice radio systems, and addition of Fire Station Alerting project.

JUSTIFICATION

The Public Safety Systems require modernization. The CAD system is reaching the end of useful life and does not meet the County's current operational requirements, impacting the response time of first responders to 9-1-1 calls. The CAD roadmap Study completed in March 2009, recommended replacement of the system to address existing shortcomings and prepare for the next generation 9-1-1 systems. Manufacturer's support for the voice radio system will begin to be phased out December 31, 2009. Beyond that date the manufacturer will only continue to provide system support on an "as available" basis, but will not guarantee the availability of parts or technical resources.

The CAD modernization will initiate with a detailed planning phase that will include the use of industry experts to assist in both business process analysis and developing detailed business and technical requirements for the new CAD system. Utilizing external consultants for this process will allow the County to incorporate lessons learned and best practices from other jurisdictions.

The fire station alerting system upgrades were identified as a need under Section 5 of the MCFRS Master Plan (adopted by the County Council in October 2005) and detailed in the Station Alerting and Public Address (SA/PA) System for Fire/Rescue Stations, Rev 1, 2006. This project allows for the continuous and seamless functioning of the alerting systems within each fire station. A preliminary survey by DTS of existing conditions at all stations revealed system wide

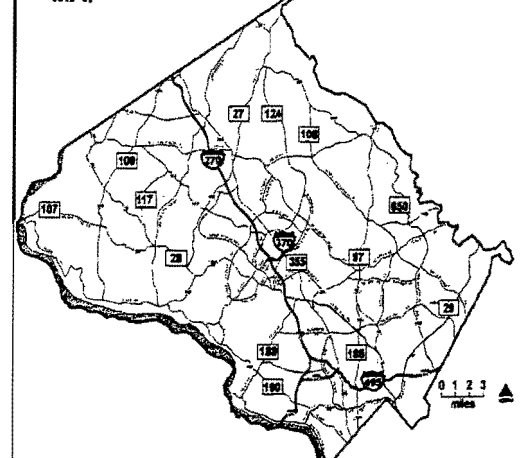
APPROPRIATION AND EXPENDITURE DATA

Date First Appropriation	FY09	(\$000)
First Cost Estimate		
Current Scope	FY11	53,661
Last FY's Cost Estimate		6,883
Appropriation Request	FY11	3,550
Appropriation Request Est.	FY12	18,570
Supplemental Appropriation Request		0
Transfer		0
Cumulative Appropriation		3,043
Expenditures / Encumbrances		2,947
Unencumbered Balance		96
Partial Closeout Thru	FY08	0
New Partial Closeout	FY09	0
Total Partial Closeout		0

COORDINATION

Public Safety Steering Group
Department of Technology Services
Department of Police
Montgomery County Department of Fire and Rescue Service
Sheriff's Office
Department of Corrections and Rehabilitation
Office of Emergency Management and Homeland Security
Department of Transportation
Department of Liquor Control
Montgomery County Public Schools (MCPS)
Maryland-National Park and Planning Commission (M-NCPPC) Park Police
Washington Metropolitan Area Transit Authority (WMATA)

MAP



Public Safety System Modernization -- No. 340901 (continued)

concerns, including inadequate spare parts inventory and lack of available maintenance support for alerting systems.

As more of the County's regional partners migrate to newer voice technologies, it will affect interoperable voice communications. To ensure that the County maintains reliable and effective Public Safety (voice radio) communications for the operations of its first responders and to sustain communications interoperability for seamless mutual aid among its regional partners, the County needs to commence planning and implementation of a program to upgrade and modernize its portable and mobile radio units and subsequently the communications infrastructure.

OTHER

Coordination with participating departments/agencies and regional partners will continue throughout the project.

FISCAL NOTE

Funding in FY09 includes Urban Area Security Initiative (UASI) grant funding of \$2.055 million and Fire Act grant funding of \$988,000. Funding in FY11 includes Urban Area Security Initiative (UASI) grant funding of \$300,000.

Questions – Public Safety System Modernization

Please provide responses by Friday, February 12.

Expenditures/Schedule

1. Please complete the attached breakout showing costs for the PSSM project over the six-year CIP period. Please add rows if needed.

Response:

Please reference the attached PSSM CIP budget breakdown.

2. Please provide a timeline showing the anticipated timeframe for the planning, procurement, and implementation (including go-live date) of the CAD, station alerting system, and radio infrastructure replacements.

Response:

Please reference the attached PSSM CIP budget breakdown.

High-level milestones –

CAD go-live sometime in FY13

Station alerting fully implemented in FY14

All radios (handheld and mobile) replaced by FY14

3. Please provide information about the P-25 standard for radios.

Response:

The Montgomery County Communications Interoperability Plan (MCCIP) provides an excellent explanation of the Federal DHS public safety interoperability continuum and the development of the P25 standard (pages 21- 23).

Selected highlights –

- P-25 is a set of standards being developed and implemented in two phases. P-25 Stage 1 began in 1989. It applies to the VHF, UHF, 700 MHz, and 800 MHz frequency bands.
- The P-25 CAI (common air interface) provides a methodology for multiple vendors to provide components of infrastructure and radios.
- The P-25 CSSI (console subsystem interface) defines interactions between an RFSS (radio frequency subsystem) and consoles.
- The P-25 ISSI (inter-subsystem interface) defines interactions between and among various infrastructure subsystem components.

- P-25 Phase 2 adds TDMA (Time Division Multiple Access) for radio spectrum efficiency.

4. Why is it necessary to upgrade to P-25 radios Countywide before replacing the radio system infrastructure?

Response:

The MCCIP defines the phased approach for the deployment of the radios and implementation of the radio infrastructure (pages 2-5). The phased approach timeline is adjusted to reflect available funding. This strategy was corroborated by the industry expert consultant. The consultant provided additional details and explanation at the Council session on July 23, 2009.

Selected highlights –

- Because neighboring jurisdictions (e.g., Prince Georges County, Loudoun County, Arlington County, Alexandria City) are already in the process of fielding P-25 based radio systems, it is necessary to upgrade public safety radios to be P-25 capable. Failure to do so will result in loss of interoperability between Montgomery and those jurisdictions that have upgraded or soon will.
- By replacing the radios first, when the radio infrastructure is updated, all the radios will be ready to take advantage of the new radio infrastructure capabilities.

5. Please provide an update of the “Radio CIP Upgrade and Modernization Schedule” that was included in the budget request to the Executive. Please include information about any P-25 radios that were already purchased and the source of funds for them.

Response:

The schedule has not changed; therefore, the same can be used.

All radios purchased to date are P-25 compatible XTS 5000 Motorola models.

Two Grants provided radios as follows:

Fire Acts Grant	247
UASI Grant	<u>623</u>
Total	870

6. It is Council staff’s understanding that a cache of radios was purchased with UASI funds a few years ago to assist with interoperability during multi-jurisdictional responses to incidents. How many radios were purchased? Who manages the cache? How is replacement handled? Are the radios P-25 compliant? Under what circumstances are the radios placed in service?

Response:

Montgomery County houses an emergency cache of 500 radios for the National Capital Region (NCR). The NCR radio contact for Montgomery County is John Freeburger who works for Fire & Rescue. The radios that were purchased are housed in a mobile trailer and are P25 compliant. Deployments of the radios are governed by NCR protocol. John Freeburger is available to discuss in more detail.

7. When the Station Alerting System project was added to the CIP last year, an immediate issue was that the old system could not be extended to new fire stations. If the implementation of the Station Alerting System is delayed to coordinate with the CAD replacement, how will station alerting be provided for new stations that become operational before the new system is available?

Response:

Fire & Rescue has secured four units from neighboring Fairfax County that were decommissioned when they replaced their old Station Alerting System. These units will be utilized for the newly constructed Fire stations and provide backup for any units that fail. This is only a short-term stopgap, as this equipment is no longer manufactured. The strategic plan is to focus on the PSSM and implement a CAD replacement with Station Alerting.

8. The Public Safety Communications System includes several types of equipment for individual users or vehicles such as MDTs, ePCR tablets, and Police in-car video equipment. What is the replacement schedule for each type of equipment? How will the replacements be funded?

Response:

The MDTs have a lifespan of 4-5 years, and given the large fleet of MDT's, an ongoing replacement of one fourth or one fifth of the inventory annually makes the most sense. The tablets are expected a 3-4 year lifespan, since they are removed from the vehicles and subject to more physical stress. Given the smaller inventory, tablets could be replaced all at once. The video equipment may last a little longer (5-6 years) as they do not have to keep up with operating system or application software changes. Operating funds and grants have been used previously for MDT replacements. Funding for future replacements will have to be identified.

These are best practice life cycle replacement timeframes. However, based on recent economic conditions funding may not be available to maintain this replacement timeframes. The life cycle and replacement timeframes may differ based on funding availability.

9. How much training will be needed to transition public safety users to the new PSCS? How much will the training cost, and how will it be funded?

Response:

Training can be broken down into the following sub-areas:

CAD (which includes RMS and Station Alerting)

Both Functional and Technical Training will be required at various levels for all systems.

<u>Planned Training Class</u>	<u>Targeted Audience</u>
CAD Administration	PSDS Team and Dept CAD and Mobile Managers
CAD Dispatcher Training	Law Enforcement and Fire Call Takers & Dispatchers
Remote CAD Training	Law Enforcement and Fire Field Users, PSAs, Records Clerks, TRS
Mobile (MDC) CAD Training	Law Enforcement and Fire Field Users
RMS/Field Reporting Administration	PSDS and Law Enforcement RMS and Mobile Data Managers
Field Reporting Training	Law Enforcement Field Users
RMS Overview/Query Training	All Law Enforcement Employees
RMS Module Training	Targeted Training for Law Enforcement Work Units such as; Records, Warrants, Investigations, Domestic Violence, Registered Offenders

The amount of training will vary by user and the extent of their use of the various systems. Initial training costs have been factored into the implementation costs of the systems. On-going training needs will replace classes on current systems and will be absorbed into current operational budgets.

Public Safety Radio System

Basic functional training will be required for the end-users of the new Mobile and Portable Radios.

Given that both new software and new business processes will be implemented, rigorous training will be needed. The CIP includes funding for training.

10. The Operating Budget Impacts in the PDF show that a total of \$2.4 million will be required for maintenance of the new system over the six-year CIP period. What is included in these costs? Will there be any other costs related to the operation of the new system?

Response

The maintenance cost includes software maintenance with 7x24 support for the CAD system. Other additional operating costs have not been identified.

Funding

11. Which short term financing mechanism will be used to fund this project?

Response:

The best estimate at this time is that Finance would issue Certificates of Participation or some other form of short-term lease to finance the project. This is subject to change since it is hard to predict early on what form of debt will be used since the actual cash needs may change over time.

12. What is the schedule for payback of the short term financing? What will be the carrying cost of the debt?

Response

The scheduled payback begins in FY12 and continues over 6 years. The estimated interest rate is approximately 5.0% on the \$46.5 million of short-term financing. The estimated debt service payments are: FY12 - \$1.1 million; FY13 - \$7.6 million; FY14 - \$14.7 million; FY15 - \$15.8 million; FY16 - \$9.3 million; and FY17 - \$2.2 million.

13. What will the bond funding be used for? What is the justification for using bonds as opposed to current revenue or short term financing?

Response

The Bond funding will be used for the Fire Station Alerting upgrades that are included in the project. The reason Bonds are being used is that the alerting system includes IT hardware components and computer systems, which are Bond eligible.

Planning

14. Which planning activities will be funded with the \$3.2 million that is scheduled for Planning, Design, and Supervision for the six-year CIP period?

Response:

This project will follow the methodologies and strategies presented in the Public Safety Systems Modernization (PSSM) plan completed in July 2009. The CAD study and the PSSM plan can be found on the DTS Department website <http://www.montgomerycountymd.gov/dts> under the Strategic Plan tab.

The CAD modernization will initiate with a detailed planning phase that will include the use of industry experts to assist in both business process analysis and developing detailed business and technical requirements for the new CAD system.

In conjunction with system requirements development will be a Business Process Review. This review will look at business processes in the Emergency Communications Center to determine the optimal processes, how they can be improved by leveraging capabilities in a new system, and what design considerations may be required of a new system in order to meet the business needs.

15. A study of MCFRS communications processes is currently underway and is expected to be completed by mid to late April. Will a study of Police communications processes be conducted? If so, when? If not, why not?

Response:

No, a study of the Police Communications Process within the 9-1-1 Emergency Communication Center will not be undertaken. The MCFRS study was commissioned to

address MCFRS specific response times as compared to national standards. The MCFRS study will touch upon Police Emergency call taking operations as they relate to the hand off of 9-1-1 calls for Fire/EMS to MCFRS and the potential for unifying call taking operations under a Common Call Taker Model.

16. To what extent do municipal police departments and Park Police use the County's Public Safety Communications System? How will they have input into the County's planning for the PSSM?

Response:

The local municipal police departments and MNCPPC integration with the County are documented in the PSSM and MCCIP documents. Both are active members of the PSSM workgroup. The PSSM workgroup will continue to leverage the strong governance model. The CAD Roadmap study listed "best practices" and "lessons learned from PS200" and relevant recommendations will be incorporated in the PSSM workgroup processes.

DEPARTMENT OF TECHNOLOGY SERVICES - FY11 - 16 CIP SUBMISSION REQUESTS

Project Name:	Public Safety System Modernization (PSSM) - 341101 (\$000's) (incl. Fire Station Alerting)									
	Total	Thru FY10	6 Years	FY11	FY12	FY13	FY14	FY15	FY16	Beyond 6 Years
CAD System	23,340	-	23,340	550	11,420	11,370	-	-	-	-
Station Alerting	3,340	-	3,340	500	500	1,420	920	-	-	-
Radio Units	25,131	3,043	22,088	2,200	6,200	7,828	5,860	-	-	-
Radio Infra. PIng	1,850	-	1,850	300	450	450	650	-	-	-
Radio Infrastructure	-	-	-	-	-	-	-	-	-	-
Total PSSM	53,661	3,043	50,618	3,550	18,570	21,068	7,430	-	-	-

Radio CIP Upgrade and Modernization Schedule													
	Total	Upgrade		FY11		FY12		FY13		FY14		FY15	
	Inventory	# units		Units	\$	Units	\$	Units	\$	Units	\$	Units	\$
RADIOS													
Portable Radios:			\$ 4										
Montgomery County Police	1256	956	\$ 3,824	335	\$ 1,340	310	\$ 1,240	311	\$ 1,244	0		0	
Montgomery County Fire and Rescue	1566	1,119	\$ 4,476	335	\$ 1,340	390	\$ 1,560	394	\$ 1,576	0		0	
Sheriff	147	147	\$ 588	75	\$ 300	72	\$ 288		\$ -				
Correction and Rehabilitation	152	152	\$ 608		\$ -		\$ -	152	\$ 608				
Park Police ***	123	0	\$ -		\$ -		\$ -		\$ -				
Public Works & Transportation	343	343	\$ 1,372		\$ -		\$ -	343	\$ 1,372	0		0	
Homeland Security	10	10	\$ 40		\$ -		\$ -	10	\$ 40				
Security	24	24	\$ 96		\$ -		\$ -	24	\$ 96	0		0	
Other ****	53	53	\$ 212		\$ -		\$ -	53	\$ 212	0		0	
Enterprise Coordination Stock *****	0	100	\$ 400	20	\$ 80	20	\$ 80	20	\$ 80	40	\$ 160	0	
Total Portable Radio Upgrades	3674	2,804	\$ 11,616	765	\$ 3,060	792	\$ 3,168	1,307	\$ 5,228	40	\$ 160		\$ -
Mobile Radios:													
			\$ 4										
Montgomery County Police	1745	1,745	\$ 6,980	100	\$ 400	545	\$ 2,180	550	\$ 2,200	550	\$ 2,200		\$ -
Montgomery County Fire and Rescue	437	437	\$ 1,748	100	\$ 400	100	\$ 400	100	\$ 400	137	\$ 548		\$ -
Sheriff	73	73	\$ 292	35	\$ 140	38	\$ 152		\$ -		\$ -		\$ -
Correction and Rehabilitation	9	9	\$ 36		\$ -		\$ -	0	\$ -	9	\$ 36		\$ -
Public Works & Transportation	312	312	\$ 1,248		\$ -		\$ -	0	\$ -	312	\$ 1,248		\$ -
Park Police ***	80	0	\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
Homeland Security	0	0	\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
Security	2	2	\$ 8		\$ -		\$ -	0	\$ -	2	\$ 8		\$ -
Other ****	40	40	\$ 160		\$ -		\$ -	0	\$ -	40	\$ 160		\$ -
Total Mobile Radio Upgrades		2,618	\$ 10,472	235	\$ 940	683	\$ 2,732	650	\$ 2,600	1050	\$ 4,200		
Total System Radios		5,422	\$ 22,088	1000	\$ 4,000	1475	\$ 5,900	1957	\$ 7,828	1090	\$ 4,360		\$ -
Consulting Services:													
			\$ 1,350		\$ 300		\$ 450		\$ 450		\$ 150		\$ 0
Radio Infrastructure Modernization:													
			\$ 50,000		\$ -		\$ -		\$ -		\$ 30,000		\$ 20,000
TOTAL CIP EXPENDITURE REQUEST:			\$ 73,438		\$ 4,300		\$ 6,350		\$ 8,278		\$ 34,510		\$ 20,000
Radio Assumptions													
All Portable and Mobile Radios must be XTS5000s, XTL5000s or equivalent (P-25 compatible) and upgraded by year 2014 as infrastructure build-out begin													
Radio unit costs are based upon current average cost of \$4000 each													
The total radio unit upgrades are front loaded during the first 3 years because Montgomery County must coordinate with system upgrades in other jurisdictions to assure continued interoperability													
*** Note that Park Police has approximately 123 Portable and 80 Mobile Radios (All are already P-25 compatible)													
**** Other include: Radio Shop, Liquor License Board, School Board, CEO, CAO													
***** Systemwide Portable and Mobile maintenance spares needed for rollover coordination, and/or Emergency On-Hand Stock													
Infrastructure Assumptions													
a. 2010 is end of Motorola formal support for current radio system.													
b. System replacement must be coordinated with system upgrades in other jurisdictions to assure continued regional interoperability.													
c. Estimated replacement cost for the radio infrastructure is \$40 - \$50 million. System replacement must be coordinated													

		2011	2012	2013	2014	2015	2016	TOTALS
CIP 2011-2016 (\$53m)								
Radio	Radios (P25 compliant)							
CAD	CAD Planning							
	CAD Procurement							
	CAD Deployment							
Stations	Station Alerting							
TOTALS		\$3,550	\$18,570	\$21,068	\$7,430	\$0	\$0	\$53,661
Future CIP add-on (\$50m)								
Radio Infrastructure								
	Software							
	3 additional towers							
	Computer Boards							
TOTALS								\$50,000
Other								
Data, devices	MDTs, EPCR,							
Infrastructure	eJustice, FireHouse, VoicePrint							
NextGen911	NextGen911							
TOTALS								\$
Grand Totals		\$	\$	\$	\$	\$	\$	\$

Figures in \$000s

Message from the Public Safety Systems Modernization Workgroup

Montgomery County Government (MCG) Public Safety Departments have made significant advances by embracing technology solutions that improve business response to its citizens as well as streamlining the internal business processes. To continue the positive contributions from our investment in Information Technology (IT) solutions and innovations, it is essential to articulate our interpretation of Executive guidance as well as business mission objectives to prepare for future technology choices.

The purpose of this Public Safety Systems Modernization plan (PSSM) is to describe and document Public Safety's interpretation of the direction of technical issues and to set the baseline for how information technology solutions are approached. While the PSSM is a point-in-time assessment of current processes and methods, it also illustrates the significant achievements and streamlining from previous efforts. PSSM sets a definitive road map for new objectives and methods.

This is a "living" document that will be reviewed on a periodic basis both internally as well as through the MCG Executive Leadership to ensure that it continues to support the Public Safety business mission and strategies. The use of the PSSM to guide our Information Technology investments and activities will allow us to maintain a sustainable alignment between our corporate mission and technology improvement expectations.

A collection of handwritten signatures in black ink, arranged in a loose cluster. The signatures are: Charles Bailey (top left), Gene Cummins (top right), Bill Ferretti (middle left), Albert George (middle left), Debbie Greenwell (middle right), Bobby Johnson (middle left), John Kinsley (middle right), Dieter Klinger (middle right), Michael Knuppel (bottom left), David Linn (bottom left), Brian Melby (bottom left), David Scibelli (bottom left), Michael Tarquinio (bottom right), and Mark Wulff (bottom right).

→ The members of the Public Safety Systems Modernization Workgroup are: Charles Bailey, Gene Cummins, Bill Ferretti, Albert George, Debbie Greenwell, Bobby Johnson, John Kinsley, Dieter Klinger, Michael Knuppel, David Linn, Brian Melby, David Scibelli, Michael Tarquinio, and Mark Wulff.

1 Introduction

Montgomery County takes advantage of mature technologies in areas of data, voice and radio networking, datacenter operations and monitoring, hardware and software systems deployment, and application development. The purpose of this Public Safety Systems Modernization (PSSM) plan is to set the course for fully defining the Montgomery County objectives surrounding how the organization will approach public safety systems and technology from an enterprise perspective. The outcome of this effort will aid in the development of a long term systems strategy guiding public safety agencies. The strategy should determine what the organization's capabilities are today, where the public safety and other county leaders want to be tomorrow and, most importantly, how as an organization we can achieve the most desirable and sustainable enterprise public safety solutions.

In early 2009, Montgomery County was introduced to a new, enterprise technology strategic plan. This plan endeavors to create a more sustained focus on the development of business driven dynamics as the key starting point for introducing new technologies that support the enterprise as a whole, or at the very least, provide opportunities that cross departmental boundaries. This "theming" approach is at the forefront of the teaming process that has been undertaken with the development of the Public Safety Systems Modernization effort.

Public Safety Executives, in concert with Technology Services are at the core of this effort to ensure an outcome that is representative of the continued leadership that Montgomery County exemplifies in many areas. With the concerns over life/safety systems that are quickly reaching obsolescence, the significant costs involved with upgrade and/or replacement, and the increasingly important trend of interoperability, Montgomery County leaders have made the commitment to develop and support a modernization plan that will result in the most viable approach to modernizing these critical systems.

Public Safety as a theme encompasses numerous County departments. The keystone departments for County public safety immediately include the Montgomery County Police Department (MCPD) and Montgomery County Fire and Rescue Service (MCFRS). However, given the significant change in the past decade, other departments have joined as equally crucial members of the Public Safety community. Included in this new model, the Office of Emergency Management and Homeland Security (OEMHS), the Department of Corrections and Rehabilitation (DOCR) and the Department of Technology Services (DTS) play a role in citizen and community safety.

Montgomery County Police Department

The Montgomery County Department of Police is committed to providing the highest quality of police services to the people who live, work and visit our County. The MCPD pledges to constantly evaluate and improve efforts to enhance public safety with the goal of improving the quality of life within Montgomery County, while at the same time maintaining respect for individual rights and human dignity.

Montgomery County Fire and Rescue Service

The vision of the Montgomery County Fire and Rescue Service is to keep Montgomery County communities safe and healthy by providing the best fire, rescue, and emergency medical services, utilizing career and volunteer resources.

Department of Emergency Management and Homeland Security

The Office of Emergency Management and Homeland Security plans, prevents, prepares and protects against major threats that may harm, disrupt or destroy our communities, commerce and institutions.

Department of Corrections and Rehabilitation

The Montgomery County Department of Correction and Rehabilitation is a civilian agency managed by professionals in the correctional field. Established in 1972, it provides progressive and comprehensive correctional services through the use of pre-trial supervision, secure incarceration and community treatment and reintegration programs. The Montgomery County Correctional Facility (MCCF), Montgomery County Detention Center (MCDC) and Pre-Release Center (PRC) achieved 100% compliance with the Maryland Commission on Correctional Standards (MCCS) during the last audit cycle in 2007.

Department of Technology Services

The mission of the Department of Technology Services is to ensure that Montgomery County Government is a fully integrated enterprise in which all Montgomery County Government Departments and Offices have the ability to utilize reliable, accurate and secure information to perform the government services and functions essential to the citizens of Montgomery County.

1.1 Users

There are Federal, Local Jurisdictional and County Government users of the Public Safety System. These users include:

- Montgomery County Police Department (MCPD)
- Montgomery County Fire and Rescue Service (MCFRS)
- Office of Emergency Management and Homeland Security (OEMHS)
- Department of Correction and Rehabilitation (DOCR)
- Department of Technology Services (DTS)
- Montgomery County Sheriff's Office (MCSO)
- Department of Health and Human Services (DHHS), Public Health
- Department of General Services (DGS), Facilities
- Chevy Chase Village Police Department
- City of Gaithersburg Police Department
- City of Rockville Police Department
- City of Takoma Park Police Department
- National Naval Medical Center Fire Department
- National Institutes of Health (NIH) Fire Department
- National Institute of Standards and Technology (NIST) Fire Department
- Walter Reed Army Medical Center Fire Department
- David Taylor Model Basin Fire Department
- Maryland State Police (MSP)
- Maryland National Capital Park Police (MNCPPC)

7 Next Steps

Montgomery County will continue to be a technology leader in Public Safety Systems. The immediate next steps in the Public Safety Systems Modernization Plan focus on the implementation of recommendations from the MCCIP Plan and the CAD Study, both designed to help establish roadmaps for modernization. The Public Safety Systems Workgroup will collaborate to identify funding sources for these initiatives.

7.1 MCCIP Plan Overview

The County engaged an independent public safety system's consultant to survey the state of the current Public Safety 800MHz voice and data radio systems and report on recommendations for moving forward.

The main areas of focus were:

1. Analyzing and reviewing the State of Maryland Communications Interoperability Plan (SCIP) and the Montgomery County Communications Modernization Plan to identify synergistic opportunities and any voice or data interoperability advantages the State system might provide.
2. Reviewing and documenting the current state of the 800 MHz Public Safety Radio, voice and data systems (PSRS) and documenting staff and users opinions of these systems.
3. Conducting an objective study of the future of Public Safety radio (voice and data) systems; discussing trends and best practices in 800 MHz and 700 MHz system deployments; discussing suitable transition plans from the current Public Safety radio systems to a new replacement system(s), all with a focus on interoperability in the National Capitol Region..

7.2 CAD Study Overview

The County engaged an independent public safety system's consultant to evaluate the current Computer Aided Dispatch (CAD) system and provide a roadmap for moving forward. A final report was delivered in February 2009.

The analysis and report had three major points of focus.

1. Identifying and documenting business needs that are not being met by the current system,
2. Making recommendations for replacing the current CAD system and enumerating the best practices for implementing a new CAD system, and
3. Providing guidance for extending the useful life of the current CAD system until a new CAD system is operational.

The study determined that the current CAD system (Altaris CAD) does not meet several current business needs and is not capable of meeting emerging business needs stemming from advances in 9-1-1 and consumer communications. The county must begin the process of

selecting and implementing a next generation CAD immediately. Later sections of the CAD Study report detail the steps that need to be followed and an estimated timeline.

The current CAD system is based on out-dated software technologies and is running on hardware that is near, and in some cases already reached the end of its useful life. The county has begun planning and acquiring replacement hardware. It is imperative that the county follow through with these plans to ensure continued operations of the current CAD system until a next generation CAD system can be implemented. Later sections of the CAD Study report describe the steps necessary to maximize the usefulness of the current system.

The county should look for a modular, standards-based solution in a new CAD system to be able to adopt and implement new technologies as needed. The county also needs to dedicate the resources to ensure that the replacement selection and implementation process is completed in a timely manner, to maximize the expected useful life of the next system.

The public safety workgroup will use the findings of this study, aligning requirements with the other systems comprising the PSCS identified in this modernization document and the MCCIP plan, and develop a Capital Improvement Plan for the design, selection and implementation of a next generation CAD system.

I. Executive Overview

Strategic Situation

For over seven years the existing Motorola ASTRO SmartZone public safety trunked radio system has served Montgomery County ("the County") well, eliminating many deficiencies that existed in the previous conventional radio systems used by public safety agencies including the Department of Corrections and Rehabilitation (DOCR), Montgomery County Fire and Rescue Service (MCFRS), Montgomery County Police Department (MCPD), and the Montgomery County Sheriff's Office (MCSO). All County public safety agencies are now on a common radio platform, can and do communicate with one another on a routine basis, have better coverage than in the past, and have interoperability with most public safety agencies in the National Capitol Region (NCR) and beyond. That the County has benefitted from the existing system is beyond question, and its value has been demonstrated time and again when the public safety agencies have been on the front line of response to incidents as diverse as the Beltway sniper incidents, railway accidents, and a plethora of less publicized, but nonetheless urgent events.

Planning of the County's existing 800 MHz trunked radio system commenced in 1994, and a contract award for the network was signed with Motorola in December 1999. The trunked radio system was ready for operations in the spring of 2002, but owing to issues with the Computer Aided Dispatch (CAD) system and the Mobile Data Computer System (MDC), full operation was deferred until July, 20, 2003. At the time of implementation the system represented the current state of the art in public safety radio communications.

In the rapidly evolving telecommunications industry, generational changes in technology, standards, and electronic components tend to shorten the expected usable lifespan of network investments. Convergence between telecommunications and information technologies has rendered obsolete proprietary networking technologies and vestiges of circuit-switched telephony on which many mobile radio communications systems were based, including that of the County. Standards for digital public safety communications systems intended to improve interoperability and to stimulate competition among multiple suppliers have evolved since the County embarked on its system implementation. While beneficial in the long term, in the short term, these standards have introduced new incompatibilities that challenge the continuity of effective interoperability among public safety first responders and have hastened the obsolescence of existing systems, including that of the County. At present, the County radio communications system is nearing the end of the continuum of factory support, and little flexibility is provided for system infrastructure upgrade short of replacement.

Urbanization of segments of the County combined with increased noise levels in the 800 MHz radio frequency band has degraded the coverage performance of the existing radio system. Additional base station sites are needed in built-up areas to restore the level of coverage of the system to its original reliability. Obsolescence of the trunked radio system prohibits the needed increase in base station sites to upgrade performance of the system.

Other counties and cities in the National Capital Region with which the County public safety agencies interoperate on a routine basis have commenced system planning or implementation of radio system upgrades. To avoid incompatibilities that will affect public safety operations, it is necessary that interoperability partners make certain upgrades in, or nearly in, unison.

Montgomery County must commence planning and funding upgrades to its existing trunked radio system before factory support of the network deteriorates in the years beginning with 2012. Such upgrades will serve the dual role of maintaining the acclaimed interoperability that exists in the National Capital Region and correcting degradation of the reliability of the existing County system.

Goals and Objectives of the Montgomery County Communications Interoperability Plan

Goal

It is the goal of the Montgomery County Communications Interoperability Plan to ensure that the public safety first responders of Montgomery County can fulfill their missions safely and can respond promptly to the needs of the public in emergencies through the use of reliable, interoperable, and flexible voice and data radio communications to provide dispatch, coordination, and information in the mobile environment.

Objectives

Objectives of the Montgomery County Communications Interoperability Plan are to:

Provide reliable radio communications system performance in terms of coverage, network availability, and quality of service to public safety first responders.

Maintain and expand the highest level of interoperability between the County's public safety first responders and their mutual aid partners from within and outside of the National Capital Region to coordinate daily and emergency events by employing subscriber radios compatible with legacy and future digital technologies.

Provide access to and transmission/reception of data and video, and to permit access to dispatch, database, collaboration, and operational applications in the mobile environment with speed and reliability comparable to a wired office connection.

Ensure that system upgrades will meet the needs of the County for a decade and that the technology selected is in keeping with the overall trend of the telecommunications and information technology industry toward open architecture, data security, quality of service metrics, and interoperability.

Strategy

It is the strategy of the interoperability plan to continue the provision of a current technology trunked radio communications system that meets the current and future needs of the County public safety first responders while optimizing the utilization of current resources and through cooperation with interoperability partners. To the extent practical the County will employ resources made available by the Federal broadband initiative and other sources of interoperability funds.

Phased Implementation

A multi-phased implementation schedule is proposed over a minimum five year period. A three phase schedule permits expenses to be spread over multiple funding cycles and will allow certain industry standards and regulations to be that are in development to be finalized.

In the first phase, that spans three years, short term improvements will be made by upgrading portable and mobile radios assigned to public safety first responders to more capable software-defined radios. Such radios have the ability to operate in multiple modes, thereby bridging the generations of technology that will exist in the region without loss of interoperability. Such radios enable communications with new generation P25 Phase I and Phase II standard radio systems that are in deployment in the region and are also backward compatible with legacy systems.

Work on plans and specifications for the upgrade of the trunked radio communications system also must commence in the first phase. The objective of these plans is the development of goals and objectives for a system to meet the tactical voice radio communications needs of the first responders and to plan for the eventual use of broadband wireless network for data and video communications. Options for system sharing and/or participation in a network of networks will be explored in the planning process. A detailed implementation plan and budget for network infrastructure upgrades will be produced along with a procurement document for the upgraded voice radio system.

In the second, interim, phase beginning in the fourth year the procurement and installation of voice radio system infrastructure upgrades will commence. These upgrades will affect the radio system, its interconnecting network, and the public safety communications center console equipment. At the conclusion of the installation of the improved voice communications system, some legacy subscriber equipment will be passed on to non-public safety governmental radio system users. The second phase is estimated to take two years, with a projected completion date of 2014.

The third phase is a long term action plan for the implementation of wireless data and video applications on a broadband network. Such applications and the networks themselves are still only loosely defined and final regulations have not been promulgated. It is expected that clarity will emerge over the next two years from the extensive effort being expended by public safety and the private sector to jointly or singly develop a national broadband infrastructure for public safety. As presently defined, such a broadband network will reflect some of the convergence of voice, data, and video access to and from the mobile environment. An eventual progression to the provision of tactical push-to-talk voice communications over such networks may evolve over the next decade, but is not the primary driver of this technology.

Initiative	Short Term (Years 1-3)	Interim Phase (Years 3-5)	Long Term (>5 Years)
Interoperability	Purchase subscriber units compatible with both legacy and next generation systems to maintain interoperability in NCR and to prepare for system replacement in Montgomery County	Transition subscriber units to next generation trunked system being installed by Montgomery County, cross programming or system of systems to provide interoperability with mutual aid partners	Continuing programming and networking to maintain interoperability with mutual aid partners
Operability	Begin planning and specification of next generation trunked radio system for Montgomery County	Procurement and implementation of next generation trunked radio system	System in full operation and add subscriber units to reflect County growth
Data and video	Follow national	Definition of	Participate in

access and transmission	broadband initiative, FCC filings if necessary	advanced data and video applications to enhance public safety operations	shared national broadband network or buy services from operator
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Funding

Phase I budget requirements are to fund portable radio upgrades for public safety first responders in years one through three and to commence preparation of detailed system plans and procurement documents for an upgraded network infrastructure, and to seek grants and other sources of funding for the upgrades.

Phase II budget requirements will be established in the first year of Phase I based on a detailed system design and that will be completed during the year. This design and budget will provide two years lead time to identify sources of funding before the procurement of the network upgrade commences.

Phase III funding requirements will be known by year five of the project. This phase of the project is dedicated to the provision of wireless broadband access by public safety agencies. It is likely that such service will be provided by some partnership between a wireless network operator and a regional or national public safety consortium. The form of such a consortium and the ratio of capital versus operating expenses will be determinable by year five.

Immediate Actions Required

Plans and specifications must be developed to ensure that any replacement system will meet the needs of the County for another decade and that the technology selected is in keeping with the overall trend of the telecommunications and information technology industry toward open architecture, data security, quality of service metrics, and interoperability. These plans will examine the network options available to the County, including a stand-alone system, a system that is a participant in a system of systems that permits resource sharing while avoiding the centralization of failures, and sharing of certain resources, such as antenna sites and backhaul networks with other governmental entities such as the State or adjoining counties and cities.

In the short term, the process of replacing subscriber units (mobile and portable radios used by first responders) with units capable of operating on legacy Motorola trunking technology and P25 Phase I and II systems, supporting roaming technology, operable on the 700 MHz frequency band and compatible with conventional analog operation.

E. Project Planning

The plan to replace the County's radio communications infrastructure requires that, first, the subscriber units (the mobile and the portable radios) be replaced. The subscriber units which form the overwhelming bulk of the County's inventory, the Astro Spectra mobile radios and the XTS3000 family of portable radios, are of the generation which predates the P25 technology systems. They are incompatible with the newer technology infrastructures. Therefore the subscriber units must be replaced before the infrastructure. The plan to spread the purchase of the replacement radios out over a three-year period is meant to provide a reasonable approach to the high budgetary impact of the equipment replacement cost. (The expectation is that, with a three-year procurement plan, the radio budget will be about \$10 million per year for those three years.)

In the fourth year of the planned procurement, the infrastructure replacement should begin. This includes a new zone controller and network management controller, new simulcast and prime site controllers, new base stations and comparator equipment, and more. The Gold Elite console equipment currently in use with the present system can be used with the new infrastructure, but will require significant software upgrades and new networking equipment to permit them to integrate into the IP-based architecture of the newer technology systems. The cost of the infrastructure replacement will be on the order of \$30 to \$40 million, depending on many design factors and deployment decisions.

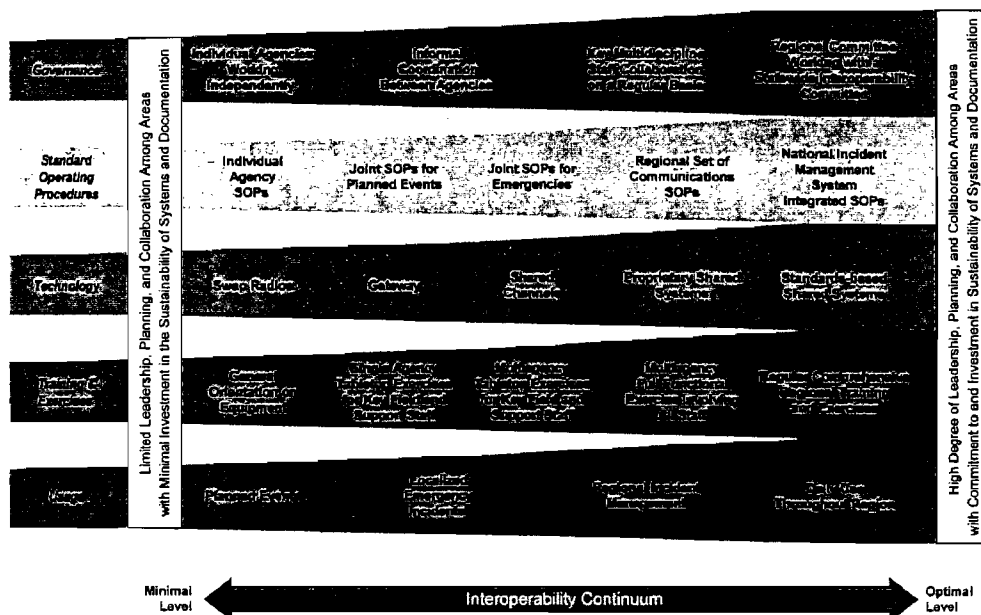
communications center to interoperate with first responders from throughout the country who might be called into Montgomery County in the event of a disaster. This was the acute first responder communications deficiency identified after Hurricane Katrina.

Advancement of interoperability is reflected in the SCIP when it states, "One of Governor O'Malley's top Homeland Security objectives is to achieve Level-4 interoperability in the near term, with the longer-range goal of achieving Level-6 radio interoperability within the first responder community throughout Maryland". As indicated in the SCIP, "State wide Level-4 attainment, simply put, is when fire fighters, emergency medical responders, police officers, deputy sheriffs, state troopers, public works and transportation officials and others can go anywhere in the state and have immediate radio communications with each other using their own equipment on designated channels. Ultimately, a Level-6 attainment will achieve seamless interoperability statewide by using standards-based shared-systems technologies".



Homeland
Security

Interoperability Continuum



DHS public safety interoperability continuum – the right column contains the definitions of Level 6 interoperability

The goal of Level-6 interoperability relates to the adoption of a standard that permits users that have purchased radio equipment from different manufacturers to interoperate seamlessly. Such a protocol has been developed and it is known as the "P25" standard. The P25 standard was adopted by the Association of

Public Safety Communications Officials (APCO) several years ago. The purpose of P25 is to overcome the lack of interoperability inherent with the proprietary radio systems that permeate the country, including the NCR. The Level-4 communications protocol limits interoperability to the users of a specific radio technology, such as Motorola's SmartZone 3.X Frequency Division Multiple Access (FDMA) architecture used in the NCR or requires the use of a communications bridge to facilitate communications between disparate radio technologies.

There are two varieties of P25 known as Phase I and Phase II. All technical standards for Phase I have been adopted and users can purchase P25 Phase I products from a number of manufacturers now. A national certification process has been adopted by the DHS and beginning in the summer of 2009, different manufacturers will be invited to test their products on the P25 land mobile radio systems of competitors. As an example, Motorola has invited competitors to its headquarters in July to test non-Motorola radios on the Motorola communications infrastructure to ensure proper operation pursuant to the adopted P25 standards. Once a radio demonstrates that it can meet all operational requirements of the P25 standard, the device will be certified as compliant.

P25 Phase II is still evolving as a finalized set of standards. It is widely believed that the P25 Phase II standards will be completely adopted by the Telecommunications Industry Association (TIA) in 2009 with equipment manufactured and sold using this technology in 2011. P25 Phase II is entirely different from Phase I; however, as part of the Phase II standard, a Phase II radio must be "backwards" compatible with Phase I standards. Through this backwards compatibility, a Phase II radio will be able to interoperate with either a Phase I or Phase II system.

The differences in the P25 phases are technically profound; however, easy to understand. Both technologies utilize a 12.5 KHz bandwidth. P25 Phase I uses the frequency to transmit or receive one talkpath (or conversation) at a time. Conversely, P25 Phase II typically permits two different talkgroups to be transmitted or received simultaneously on the frequency. Phase II accomplishes this task by dividing the digital transmissions into two "time slots" through a technology called Time Division Multiple Access or TDMA. TDMA has been utilized successfully in the cellular telephone world for many years. By combining two conversations or talkgroups on the same channel an "effective" bandwidth of 6.25 kHz is achieved. As noted earlier, the P25 Phase II standard is "backwards compatible" and if a non-TDMA P25 Phase I user affiliates (joins) with an active talkgroup, the entire talkgroup will maintain communications through the older technology used in P25 Phase I (FDMA). FDMA is the technology used in Montgomery County's current Motorola system. However, the current County radio system technology predates, and is not based on, the P25 Phase I standard.

Maryland's state government is reinforcing the Governor's call for Level-6 interoperability by issuing a Request for Proposals (RFP) for a new statewide communications system based upon the DHS adopted P25 Phase II standard. Additionally, most contemporary public safety communications systems are designed to support the P25 standard. As an example, Prince George's County is implementing a new Motorola ASTRO25 system in 700 MHz that will support P25 Phase I at the onset of operations and subsequently P25 Phase II. Both Loudoun County and the City of Alexandria, Virginia have also contracted with Motorola to upgrade their first responder communications systems to the P25 Phase I standard initially with an upgrade to Phase II in the future. Arlington County now operates a P25 Phase I system. Frederick County is considering procurement for a P25 Phase II radio system. Officials in the District of Columbia are also exploring the acquisition of a new public safety communications system for the Metropolitan Police in the 700 MHz frequency band based upon the P25 technologies. (Washington, D.C. Metropolitan Police currently operate on a system in the 490 MHz band). With respect to the users of 700 MHz equipment, these radios are designed to work in both the 700 and 800 MHz bands.

In any new land mobile radio system contemplated by the County, the P25 Phase II standard should be specified to reflect the most contemporary radio architecture. This is amplified in the SCIP when it states, "To ensure the long-term viability of this network, sufficient capacity must be maintained, open standards must be embraced, and maintenance programs must be established. Technologies that enhance the efficiency and value of existing radio/frequency channels (i.e., provide more than one talk path per channel) must be evaluated and, if deemed of value, utilized".

P25 Phase II addresses the "sufficient capacity" issue identified in the report as it doubles the number of talkpaths (simultaneous conversations) available without increasing the number of frequencies used. To put this in the simplest terms, today Montgomery County has an 800 MHz radio system with twenty frequencies permitting nineteen (19) simultaneous conversations (one frequency is used for network traffic management, not voice communications). With P25 Phase II, the same twenty frequencies could support thirty-eight (38) simultaneous conversations doubling capacity without adding to spectrum demand. Use of the P25 Phase II standard also addresses the "open standards" comment in the above paragraph. With respect to "maintenance" programs, RCC understands that the County has maintained an active maintenance program through Motorola and is satisfied with the results of that effort.

The Maryland SCIP was crafted to be a living document with continual revisions as needed. Updates to the Plan are made through the SIEC as noted in the Report when it states, "This plan promotes a collaborative approach with local jurisdictions, leveraging existing radio systems and builds on the existing public safety radio infrastructure in Maryland". This is an extremely important sentence in the SCIP as it acknowledges the importance of working with the State's local

1. Executive Summary

The Department of Technology Services (DTS), Montgomery County retained Tetra Tech to evaluate the current Computer Aided Dispatch (CAD) system and provide a roadmap for moving forward.

This analysis had three major points of focus.

1. Identifying and documenting business needs that are not being met by the current system,
2. Making recommendations for replacing the current CAD system and enumerating the best practices for implementing a new CAD system, and
3. Providing guidance for extending the useful life of the current CAD system until a new CAD system is operational.

This study has determined that the current CAD system (Altaris CAD) does not meet several current business needs and is not capable of meeting emerging business needs stemming from advances in 9-1-1 and consumer communications. The county must begin the process of selecting and implementing a next generation CAD immediately. Later sections of this report detail the steps that need to be followed and an estimated timeline.

The Tetra Tech team, through numerous interviews and review of the system documentation has compiled a comprehensive list of the deficiencies inherent in the current CAD system. This system is based on out-dated software technologies and is running on hardware that is near, and in some cases already reached the end of its useful life.

The current CAD system was proposed and designed in the late 1990's, but was not put into service until July 2003. Some of the user expectations of the system have never been realized. Contributing to the systems' limitations and issues identified since its implementation is the fact that the system is based on old technology that has not kept pace with changes in the industry. The study also found that the ability of the current CAD support vendor, Northrop Grumman, as evidenced by the long development cycles for software bug-fixes, upgrades necessitated by changes in legal requirements, and the requirement to maintain interoperability with inter-dependant systems,, does not meet the needs of the county in providing this mission critical public safety service. This further increases the importance of the county moving expeditiously to a new CAD system.

The county should look for a modular (plug & play), standards-based solution to establish the capability to adopt and implement new technologies as needed. The county also needs to dedicate the resources to ensure that the replacement selection and implementation process is completed in a timely manner, to maximize its Return on Investment (ROI) across the full useful life cycle of the new system.

The county has already begun planning and acquiring replacement hardware. It is imperative that the county follow through with these plans to ensure continued operations of the current CAD system until a next generation CAD system can be implemented. Later sections of this report describe the steps necessary to maximize the usefulness of the current system. An in-depth review of the original system architecture was also done, and recommendations are made to rectify single points of failure. Finally, through research and information gathered from four of the top CAD vendors, this report presents the latest features offered in state-of-the-art CAD systems.

Information was gathered through a brief Request for Information (RFI) that was sent to four of the top CAD vendors. The RFI responses along with the information contained on their respective Web sites demonstrates that they all provide advanced features to assist in making the call-taking and dispatch functions more efficient. A rigorous Request for Proposal (RFP) process will be required to determine which approach to these features best meets the county's needs.

- Chat Service—The administrator can assign chat privilege levels that define the actions the users are allowed to perform after signing on to the PremierOne CAD client. Once logged in, users can view the chat rooms of which they are members.

Users with appropriate privileges can create, modify, or delete chat rooms. Users can join chat rooms, and invite other users and groups to chat rooms. Authorized users can remove users or groups from chat rooms. All conversations are tracked, and reports can be run on chat room activity.

PremierOne CAD supports the following types of Chat Rooms.

- a. Temporary Public Chat Rooms are available to all authorized users of the chat service. The chat rooms are automatically deleted when the last member of the chat leaves.
 - b. Permanent Public Chat Rooms are available to all authorized users of the chat service. This type of chat rooms persists even if no users are in the chat.
 - c. Private Chat Rooms are created by an authorized user to have private conversation with other users that can only join the chat through invitation. Users can send chat invitations by selecting any of the following items: User ID, Unit ID in Unit Status, Unit ID in Incident Summary list, or the source or destination list of a message. They can also select an area on a map and initiate a chat. All users in the selected area can be invited to the chat.
- The PremierOne CAD can be configured to automatically send pages as part of dispatching an incident, and when notifications are issued. The administrator can define the specific data elements that can be sent in auto- or manually generated pages.

7. Future CAD System Cost Analysis

While it is difficult to estimate the cost of acquiring, implementing, and maintaining a new CAD system without providing very specific and detailed information in an RFP, Tetra Tech can look at the cost estimates for comparable systems as a starting point. From the four RFIs sent out, three vendors provided estimated cost information. Two of the vendors (Tiburon and Intergraph) provided estimates that are based on recent similar projects, while TriTech provided an estimate that is based on the information in the RFI. The fourth vendor (Motorola) refused to provide any pricing information. The initial acquisition estimates (including the first year's maintenance) ranged from an aggressive \$8 million to a conservative \$16 million with the subsequent maintenance ranging from \$500,000 to \$800,000 per year on an escalating scale (Appendix C).

8. Recommendations

The county should immediately begin the process of defining, finding, and implementing a new CAD system. Because this process will take some time to complete, the county must also continue with its planned server hardware and mobile replacement programs and continue to address issues with the current system as they arise.

8.1 Requirements for the Next CAD System

One lesson was repeatedly driven home in the interviews and discussions with those that worked through the implementation of the current CAD system. The contract with the vendor must very specifically detail all the requirements for the new system and have performance penalties if the vendor does not meet those requirements. An excellent example of system requirements is provided under separate cover (from Fairfax County, Virginia). This document demonstrates the time and involvement necessary to create a comprehensive list of requirements for the new system. The county should expect to spend 6 months and commit resources from every affected department and unit to ensure that the requirements are detailed and

complete. The county must also involve the county attorneys from the outset to guarantee that its interests are well represented in the contract.

8.2 New CAD System Project Change Management

The PS2000 project brought forth such sweeping changes that managing change became a lesser issue. The importance of change management in this project cannot be over emphasized. It is imperative that *ownership* of a new CAD project be established early and that change management becomes an integral part from the outset.

The *ADKAR* change management model (below) has been developed over time and has been very influential in the field. In this model, there are five specific stages that must be realized for an organization to successfully change. They include the following:

Awareness—An individual or organization must know why a specific change or series of changes are needed.

Desire—Either the individual or organizational members must have the motivation and desire to participate in the called for change or changes.

Knowledge—Knowing why one must change is not enough; an individual or organization must know how to change.

Ability—Every individual and organization that truly wants to change must implement new skills and behaviors to make the necessary changes happen.

Reinforcement—Individuals and organizations must be reinforced to sustain any changes making them the new behavior; if not; an individual or organization will probably revert back to their old behavior.

8.3 New CAD System Project Management and Timing

Project durations for CAD replacements vary widely according to the system, type of training selected, number and complexity of interfaces, and so on.

The experience of departments throughout the country suggests that 24 to 28 months will be required from conception to go-live.

Using a standard project management methodology will provide a solid road map to ensure that all mission requirements are satisfied.

The time span for performance of one phase can actually overlap activities identified in the next phase and beyond. The completion of a phase is not intended to be a prerequisite for all the activities of the subsequent phases. The following are the five phases of the project methodology:

- *Phase I—Define System*

The definition phase of the project includes writing a comprehensive RFP and selecting the vendor (after an in-depth review of responses, reference checks, and site visits).

The county must then negotiate a strong contract with the assistance of the county attorney's office, after a thorough review of the proposal, the SOW, and the contract in general with the chosen vendor.

This phase can take from 20 to 24 weeks.

- *Phase II—Business Process Review*

During this phase, the county should work closely with the vendor to review business processes in the ECC and design any software customization specified in the contract as well as the interfaces to peripheral systems. Business processes and SOPs that would benefit from the new technology should be codified and promulgated during this time.

Depending on the depth of the BPR, this phase can take from 4 to 6 weeks.

- *Phase III—Design & Build System*

This phase includes system staging and testing, system configuration, interface development, and various data collection activities in preparation for installation at the county's site. County site logistics are finalized with all items of the core system being readied for delivery.

In addition, during this phase, Acceptance Test Plans for the system (CAD and the interfaces) and the Cutover Plan are mutually derived to map a closure to the implementation of the system.

This phase can take 50 to 60 weeks.

- *Phase IV—Deliver System*

During this phase, the core system is delivered and set up. Once the system is tested and accepted, the users should be trained. The county should dedicate in-house technical staff to work closely with the vendor during system setup and testing. This will provide them with the hands-on experience necessary to do first level troubleshooting going forward. Cutover to live operations and successful completion of the 30-day operational test complete this phase.

Depending on how aggressive the training schedule is, this phase can take between 12 and 14 weeks.

- *Phase V—Project Closure & Maintain System*

This phase ties up any loose ends and begins the vendor's warranty period (usually one year).

This phase usually takes about 4 weeks.

8.4 New CAD System Architecture

Public safety agencies today depend on an ever-growing amount of critical data. This information ranges from fairly static data, such as street addresses and personnel records to highly dynamic data such as the status of events and the locations of hundreds of units. All this information is stored in a central database.

This database allows CAD applications to provide an impressive array of sophisticated functionality such as automatically recommending units using the shortest distance from the caller's location and automatically searching for other incidents that have occurred near a new event.

The newest database systems can be configured to be high-availability systems with various approaches including distributed, replicated, and clustered environments. Solution vendors proposed will be dependent on the requirements developed by the county.

8.5 County Resources Necessary for a New CAD Project

Assigning competent resources in sufficient numbers is the key to a successful implementation. A project of this magnitude and import cannot afford part time attention or the rotation of key personnel. Too much information and too many decisions exist to allow for effective personnel transfers. The minimum resources for this project should consist of the following:

- County project manager
 - Acts as the single point of contact for working with the vendor
 - Must have sufficient authority and responsibility to make decisions daily about the project
 - Coordinates the activities of dedicated personnel and resources
 - Provides sufficient resources to implement the system
 - Secures contract change approvals as required
- County IT architect
- User department lead coordinators
- County map/GIS lead maintains the master GIS database and graphics
- County system administrators
 - Work side by side with the vendor in system design and implementation
 - Collaborate with the vendor for system-specific training and implementing backup, recovery, archiving, and general system activities
 - Monitor and configure the servers, workstations, and other interface systems
 - Monitor the database daily
 - Main point for contact for user questions and problems
 - Run and design reports as needed
 - Troubleshoot system problems
 - Maintain and upgrade all system configuration and forms
 - Install software upgrades
 - Serve as liaisons for vendor's field service personnel
 - Become a knowledge base for system and interface information to aid end users
- County agency trainer becomes a system expert for ongoing training of new personnel and refresher training as needed. Each supported agency should have a designated trainer to support ongoing user needs.
- County subject matter experts provide the vendor's team with any required customer information, such as specifications, workflow, and data definitions. The subject matter experts will be available to support design discussions and field questions regarding interfaces, data conversion/data fields, and workflows.

8.6 Disposition of the Current CAD System

The county anticipates receiving from Northrop Grumman a number of fixes and enhancements for the current CAD system. Given the age and limitations of the system and the length of time required to implement updates, the county should continue to focus on software issues as they are identified and replacing the server infrastructure.

There is no argument that the current CAD system must be upgraded to ensure critical functionality for the next 2 to 3 years. The county should continue to follow best practices adopted for the enterprise systems and the ancillary public safety systems, employing commodity hardware and open standards-based software (i.e., Linux) where possible.

8.7 Strategies for Keeping the Current CAD System Functional Until It Is Replaced

Recommendations for prolonging the life of the current CAD system while awaiting replacement are based on achieving the following goals:

- Increase system performance
- Increase system reliability
- Build a reporting architecture that is flexible so it can support the CAD replacement
- Leverage the county's architecture and expertise to reduce learning curve
- Leverage the county's hardware purchasing power to reduce cost
- Extend the useful life of the CAD system

To achieve these goals, the following upgrades are recommended. These suggestions are possible approaches, and should not be considered as the only options.

Separate the database server from the CAD application server and have both running on up-to-date hardware. The goal of increased system performance would be achieved by implementing newer more powerful servers, as well as separating the application from the database. Because of numerous scheduled processes on the Oracle database servers—which include “cron” jobs, Oracle stored procedures, and miscellaneous Linux scripts—the database/application servers are heavily taxed. Moving these database activities to dedicated database servers would help with CAD application performance.

The CAD system can be recompiled to connect to an external Oracle database server decoupled from the new CAD application server. The CAD system is written in C for the HP UNIX environment. If it is moved to a different server, it would need to be recompiled and retested. Because the existing HP server is at the end of its life cycle and is no longer stable, the best solution for the CAD application is to have Northrop Grumman recompile it to run on a new server. Northrop Grumman would need to certify which operating systems support the CAD database and application. Using this recommendation, DTS can determine which type of servers to purchase. This would ensure application operations' consistency and vendor support. It would also reduce the risk to CAD system reliability and enable the database migration.

An additional benefit of taking the database and application off the existing HP UNIX servers is to lessen the load on older hardware. The HP UNIX servers are 6–7 years old, which puts CAD data at risk. The CAD system is overloading the hardware, which is aging rapidly. Many of the parts for HP systems are no longer manufactured or kept in stock by HP. Replacing hardware on the older system is very costly and with uncertain results.

The file storage could have RAID configured to allow maintenance of individual disks without downtime. Having multiple disks would improve input/output throughput for the entire database cluster. Dual fiber channels would ensure connectivity in case of a controller fault, and it would improve performance.

Relocating the database on a new file storage would reduce the risk of CAD data being exposed to a disk failure. Depending on the chosen file storage type, the hardware can provide a multitude of RAID

configuration options and hot pluggable disks in the event of a failure. This would provide the best reliability and performance for CAD and replacement for CAD. The selected file storage for the CAD environment should have a backup-to-disk option. This would speed data recovery from either a data corruption or disk failure. It would also extend the life of the other existing systems by reducing system load, thus reducing costs and providing time to evaluate replacements.

By making the CAD system more reliable, system administrators, database administrators, and other technical personnel would be freed up to conduct evaluations of CAD replacements. This would allow expediting the evaluations of CAD software packages and would reduce the amount of time, money, and resources the ECC would invest in the CAD replacement system.

The county should implement the similar, scaled-down configuration in the AECC immediately after it completes the replacements in the PSCC. This would aid in operating both centers and in maintaining spare parts for the servers and simplify the logistics of tracking the system's replacement parts for the EEC staff.

At the AECC site, a new CAD server should be purchased to support the backup CAD application. An additional new server and file storage would constitute the decoupled Oracle database for the CAD application at AECC. Because this is a backup site, redundant cluster database and application servers are not necessary.

The PSCC database and the AECC database would be kept permanently in sync (near real-time) using a Multi-Master Replication solution such as Oracle Streams included in the database. Oracle Streams is an ideal solution for systems that are geographically distributed and have a high-speed connection (e.g., a T1 line) between servers. As long as the server interconnect can keep up with the changes, the implemented system would provide failover and disaster recovery simply and reliably. Oracle Streams would provide near real-time replication of important information, and if a server outage occurs, updates are automatically stored in update queues and applied automatically when service is restored to the crashed Oracle server.

Setting up the new ECC and AECC databases should be done in phases while keeping the existing system running. Extensive tests can be conducted on the new database before flipping the switch by connecting the CAD backup system to the new database after the former has been set up to test the stability of the system.

By extending the useful life of the CAD system, the county would be in a better position from which to issue RFPs for the best price/performance solution with less urgency to replace the incumbent.

9. Best Practices

For years agencies nationwide have broached the topic of *Best Practices* for CAD systems in various venues such as APCO and IACP (International Association of Chiefs of Police). These inquiries were the impetus for APCO 36, which was ultimately published by the National Institute of Justice (NIJ) as *Standard Functional Specifications for Law Enforcement Computer Aided Dispatch Systems*. The inherent differences between agencies preclude these documents from being very specific. An agency can no more adopt another agency's CAD practices than it can their policy and procedure manual. The implementation of a CAD system must be accompanied by an extensive business practice review to integrate software functionality and practices rather than simply automating practices that might not be the most effective. The Department of Homeland Security also published a document on CAD interoperability, *Computer-Aided Dispatch Interoperability Project Documentation of Regional Efforts* in August 2008. Although this document details efforts in the western United States, it contains some basic best practices that will assist the county in its CAD replacement efforts. The following examples were gleaned from these two documents. DTS staff should consider these along with

FY09-14
Approved

Public Safety Communication System Upgrade and Mod -- No. 340901

Category General Government
Subcategory Technology Services
Administering Agency
Planning Area Countywide
Service Area Countywide

Date Last Modified June 17, 2008
Required Adequate Public Facility No
Relocation Impact None.
Status

EXPENDITURE SCHEDULE (\$000)

Cost Element	Total	Thru FY07	Est. FY08	Total 6 Years	FY09	FY10	FY11	FY12	FY13	FY14	Beyond 6 Years
Planning, Design, and Supervision	0	0	0	0	0	0	0	0	0	0	0
Land	0	0	0	0	0	0	0	0	0	0	0
Site Improvements and Utilities	0	0	0	0	0	0	0	0	0	0	0
Construction	0	0	0	0	0	0	0	0	0	0	0
Other	2,988	0	0	2,988	2,988	0	0	0	0	0	0
Total	2,988	0	0	2,988	2,988	0	0	0	0	0	0

FUNDING SCHEDULE (\$000)

Federal Aid	2,988	0	0	2,988	2,988	0	0	0	0	0	0
Total	2,988	0	0	2,988	2,988	0	0	0	0	0	0

DESCRIPTION

This project will provide for an upgrade and modernization of voice radio equipment used primarily by the County's public safety first responder agencies consisting of Police, Montgomery County Fire and Rescue, Sheriff, Corrections and Rehabilitation and Emergency Management and Homeland Security. Upgrades will be made to the subscriber equipment by replacement of mobile and portable radios, which will also include a enterprise telecommunications management and service tracking system to properly manage communications inventory and assets. As voice, data and video are beginning to converge to a single platform, this project will provide a pathway to a modern PSCS which reflects the potential technology advances as well as provides efficient and reliable systems for all users.

JUSTIFICATION

The Public Safety Communications System (PSCS) requires modernization, replacement and upgrades to apply current state of the art technologies. Manufacturer's support of parts and the existing public radio system is scheduled to be phased out December 31, 2009. Beyond that date the manufacturer will only continue to provide system support on an "as available" basis, but will not guarantee the availability of parts or technical resources.

In addition, as more of the County's regional partners migrate to newer technologies, it will affect not only interoperable voice communications, but will also diminish the critical mass for the vendor to sustain technical and equipment support in this area. To ensure that the County maintains reliable and effective Public Safety (voice radio) communications for the operations of its first responders and to sustain communications interoperability for seamless mutual aid among its regional partners, the County should commence planning and implementation of a program to upgrade and modernize its portable and mobile radio units and subsequently the PSCS communications infrastructure.

OTHER

Future years will include an assessment of the current radio system infrastructure to determine the feasibility of using portions of the existing infrastructure along with software upgrades and new networking equipment to permit full integration with the IP-based architecture of the newer technologies. Modernization of zone controllers, network management, simulcast and prime site controllers along with new base stations and comparator equipment may be necessary. Coordination with participating departments/agencies and regional partners will continue throughout the project.

FISCAL NOTE

Funding in FY09 includes Urban Area Security Initiative (UASI) grant funding of \$2.0 million and Fire Act grant funding of \$988,000. Fire Act grant funding requires a County match of \$247,000 to be funded in the FY09 Operating Budget.

APPROPRIATION AND EXPENDITURE DATA

Date First Appropriation	FY09	(\$000)
First Cost Estimate	FY09	2,988
Current Scope		
Last FY's Cost Estimate		0
Appropriation Request	FY09	2,988
Appropriation Request Est.	FY10	0
Supplemental Appropriation Request		0
Transfer		0
Cumulative Appropriation		0
Expenditures / Encumbrances		0
Unencumbered Balance		0
Partial Closeout Thru	FY06	0
New Partial Closeout	FY07	0
Total Partial Closeout		0

COORDINATION

Public Safety Steering Group
Department of Technology Services
Department of Police
Montgomery County Department of Fire and Rescue Service
Sheriff's Office
Department of Corrections and Rehabilitation
Office of Emergency Management and Homeland Security
Department of Transportation
Department of Liquor Control
Montgomery County Public Schools (MCPS)
Maryland-National Park and Planning Commission (M-NCPPC) Park Police
Washington Metropolitan Area Transit Authority (WMATA)

MAP

