

County of Henrico
Division of Fire
Technology Strategy



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Executive Summary

In the fall of 2012, a new Fire Chief was named for the Henrico Division of Fire and an intensive self-assessment process was initiated to support the Division's continued designation as an Internationally Accredited Fire Department. The Agency was reaccredited in 2013 but the process of continuous improvement on the path to excellence persists. The documents produced in support of reaccreditation (Self-Study Accreditation Manual, Community Risk Analysis and Standards of Response Cover, and Continuous Improvement Strategy) now direct our collective path forward. Planning the Agency's technology future is identified as a critical task necessary to support our objectives and goals.

Assessing the Division of Fire's past and current technology status helps to identify what is working and where improvements are needed. Henrico's technology history shows a desire to seize opportunities and adapt to change but there are failures and inefficiencies too. There has never been a comprehensive technology policy or vision within the Division of Fire and, until recently, very little evidence of leadership support for technology as an integrated business process. This has contributed to poor planning and management of hardware and resources and a failure to provide appropriate staffing of qualified technology professionals. Absent this expertise, it is not surprising that the Agency has failed to establish information technology programs that provide precise and accurate data to be used in supporting decisions fundamental to the organization's mission.

In the past there has been no process defined to connect the Division Fire's technology decisions to the priorities of its mission, the Continuous Improvement Strategy or the County's technology infrastructure. Many technology projects have developed in response to reporting requirements or one specific problem and not as part of an integrated strategy. Projects were often delayed, ran over budget, and/or did not provide the needed benefits. The lack of a formal technology policy in the Division has allowed technology to be implemented piece-meal and resulted in fragmented solutions, poor budget planning, and missed opportunities to improve efficiencies.

These technology problems aren't unique to the Henrico Division of Fire. It is well documented that the public safety industries have struggled to incorporate technology to the same degree of success seen in other industry sectors. However, there is a change in technology awareness present and growing in the Henrico Division of Fire. Leadership has completed the difficult evaluation of the Agency's technology programs and is developing strategies to implement procedural and cultural changes to improve our use of technology resources. This is what makes the Henrico Division of Fire different. It is also what is drawing the positive attention of regional and national public safety technology programs – we are well positioned to become leaders for positive change in the industry.

This document sets forth a vision and a process for structured integration of technology into the fabric of the organization and its operations, and begins to identify critical technology tasks within a 24-month planning window. It was developed considering advice from project leaders and management in County IT. The plan records the current resource deficiencies and make recommendations for new policies, processes, and staffing changes. Absent the proper resources, we acknowledge that some things won't get done but we will, nonetheless, strive for continuous improvement. By elevating the importance of technology in the structure of the organization, we will provide the professional technology foundation for empowering our professional response staff to expand their technical capabilities and to integrate their knowledge and view into the fabric of the organization and operations.

Guiding Principles – Vision and Values

DIVISION OF FIRE TECHNOLOGY MISSION

The chief mission of Division of Fire Information Technology is to provide reliable, innovative, high-quality technology solutions and service that support Henrico County's Fire and EMS responders in their mission to protect lives and property and advance public safety in the communities they serve.

DIVISION OF FIRE TECHNOLOGY VISION

- Provide a stable and scalable platform for delivery of technology services to support the business and program priorities of the Henrico Division of Fire;
 - Ensure or enhance continuity of operations
 - Protect and secure critical data
 - Comply with legal requirements for data collection and management
- Eliminate or improve technology systems that hinder our responders in performing their duties or interfere with the success of their mission;
 - Eliminate duplicative effort
 - Avoid data redundancy
 - Prevent versioning of source data except where connectivity is unreliable
 - Strive for reliable and responsive hardware and connectivity systems
 - Focus responder efforts for data collection and maintenance on information that has been identified as essential to the Division of Fire
- Reduce the complexity of our technology environment;
 - Streamline the delivery of information or services by promoting consistency and standardization
- Seek technology solutions that reduce the total cost of ownership of information technology and aid in streamlining the businesses processes they are intended to support;
 - Promote cost-savings or cost avoidance
 - Capitalize on the County's existing investments in applications and technology
 - Document the connection between the management of data and the business process it is intended to support
- Facilitate increased interoperability of data systems and devices;
 - Linking to dynamic data is preferred
 - County IT manages ETL processes; Manual exports and uploads are to be avoided
 - Division of Fire data warehouse structure incorporated as a mechanism to drive interoperability
- Increase the flexibility and responsiveness of technology systems to the changing needs of the County and its residents.
 - Innovate to increase productivity or enable greater workforce mobility

About the Henrico County Division of Fire

The Henrico County's Division of Fire is an all-hazards emergency response department, dedicated not only to fire suppression, but the provision of emergency medical care and transport, technical and water rescue, hazardous materials response, fire investigation, and emergency management.

The Division of Fire has been recognized as an Internationally Accredited Fire Department by the Commission on Fire Accreditation International (CFAI) since 1997. Currently covering an area of roughly 244 square miles, Henrico County is home to over 300,000 residents. The County is also home to a number of large special events, including two NASCAR races at Richmond International Raceway, several outdoor music concerts, a variety of sporting activities and other events. The Division provides Fire and EMS coverage at these events.

There are twenty fire stations staffed by over 500 highly trained and certified firefighters. All field personnel are State certified firefighters and also certified to the Emergency Medical Technician (EMT) level. Over 200 are also certified to provide advanced life support (ALS) services. The Division currently has on duty each day 20 engines, 15 Advanced Life Support Medic units, 5 ladder trucks, 3 Heavy Rescue Squads, 3 EMS supervisors, 3 Battalion Chiefs and a District Chief.

Technology and Henrico Fire

History

Henrico County initiated Computer Aided Dispatch for Police in 1981. Fire dispatch functions were implemented in 1983 with EMS added in 1989. A custom system to automate payroll time and attendance function was developed by Tom Owdom around 1991. Custom mainframe systems for Fire Incident Reporting and Fire Inspections were also developed by Tom Owdom and implemented in the next few years. In 2000, the Division of Fire begin to search for a commercial off-the-shelf solution to replace the Henrico Fire Roster product to address tracking of overtime hours. The selected product, Telestaff, was designed around a scheduling paradigm used by West Coast fire departments and could not be successfully implemented in Henrico. County IT did not participate in the evaluation and selection process. In 2001, a commercial off-the-shelf reporting program called "RedAlert" software was implemented and the Owdom Fire Reporting and Fire Inspection systems were decommissioned.

Henrico Fire began to integrate technology into operations when grant funding in 2005 supported installation of ruggedized Mobile Data Computers in some of the emergency response vehicles servicing the County. Federal programs for Fire and EMS reporting often use grants as a mechanism to ensure local response agencies provide the data desired by Federal and State agencies to evaluate the emergency readiness of response organizations. Additional monies from various sources continued to support expanding the MDC project until all apparatus have been fitted with at least a primary device. Record management systems designed to facilitate reporting (see Legal Requirements: NFIRS and NEMSIS) were implemented parallel to the MDC project. In addition to configuring and maintaining the devices, Division of Fire technology support became responsible for mobile connectivity to the County CAD system, device connections to hospital printers and functioning of reporting software on the devices.

After 2010, the Henrico CAD system was converted to a "hybrid" GPS dispatching system that incorporated automatic vehicle location information when available (communicated to CAD through

mobile device GPS) for use by system algorithms in determining the closest vehicles for dispatch to calls for service. Real-time vehicle and incident location information was then served back to operations through the apparatus MDCs and mobile applications developed by County IT. Thus the staff connections to response information including other emergency operations was enhanced and expanded through technology.

Around this time Red NMX was selected to replace some but not all of the RedAlert functions and the County's FireRoster was rewritten to a web-based system by County IT developer, Justin Harlow. The Division bought several licenses for a GIS derivative software designed to support the Fire Industry called FireView. The software was never successfully configured, pointing to old datasets and plotting addresses incorrectly. In 2013 the licenses were allowed to expire and the Division began to focus on direct implementation of ArcGIS to support spatial data analysis. In 2011, the State Office of EMS selected Image Trend as the software system to facilitate National EMS reporting. The Division of Fire began to evaluate Image Trends products for Fire reporting and inspections to replace the RedAlert and RedNMX systems. The application was purchased off state contract but became increasingly complicated to implement as County IT tried to work with the Division of Fire to develop data feeds to and from the County systems. Implementation was placed on hold when additional configuration at additional cost was required by the vendor to correct problems identified by County technology professionals.

By 2012 increasing awareness and evaluation of calls and response resulted in a determination by the Division of Fire that the precision of dispatch and the accuracy of response could be improved. The Division convened some operational committees to evaluate field operations and "right size" response. Based on the criteria identified by these experienced firefighters - certain location, building and use characteristics were determined to influence the field operations during a fire event. In addition, a few improvements to call classification were identified that could improve the precision of dispatch call type. Representatives from the Division of Fire began to work with County IT to implement the changes in CAD and "Right Size Dispatching" went live in February of 2013. This effort represented a successful, fully-integrated approach to information management that provided reward throughout operations.

Although the implementation and expansion of applied technology in the Henrico Division of Fire didn't flow from an established technology plan, the road leading us to the present shows a desire to adapt to change and seize opportunity. The technology history seems to demonstrate that "home-grown" technology solutions have been successfully maintained and adapted over long periods of use. Conversely, the failure of several vendor solutions indicate a need for thoughtfulness and caution when considering purchases of Commercial Off-the-Shelf solutions. The Agency is well positioned to plan for responsible and efficient integration of technology as we move forward and the current leadership places high value on the development of a well-formed plan and process to ensure we are successful.

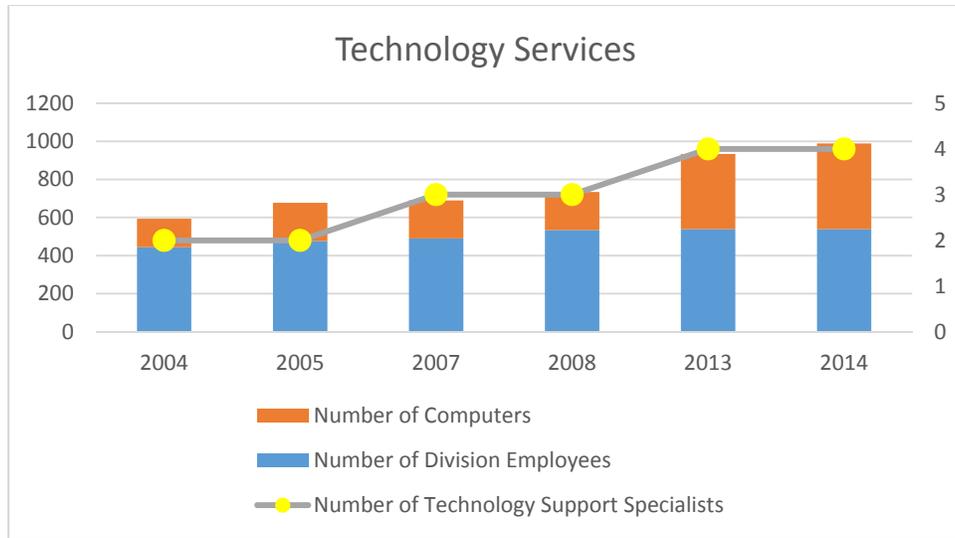
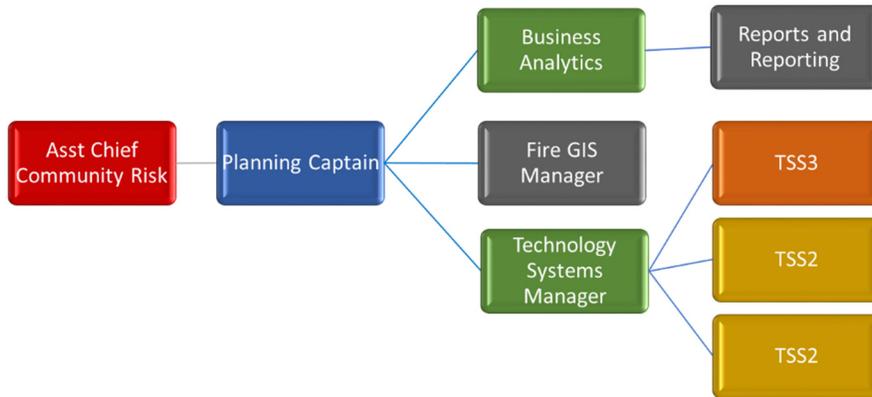


Figure 1 Partial History of Division of Fire Technology Services

Current Fire IT Organizational Chart



Current Hardware

Inventory

There are 321 computers (identified through the County’s KACE system on 5/13/2014) assigned to the Division of Fire and being managed by Fire IT. An additional 23 CF 19 devices have been purchased and are scheduled for configuring and implementation by the end of the fiscal year. There are also some 60-75 Optiplex and MDC devices that are out of warranty and in supplemental service to support various remote operation and training functions. This brings the total number of computer under Fire IT’s responsibility to about 430 for the next FY. Based on a review of budget history, the systems support team has configured and delivered about 65 new or replacement devices in each of the past four years. Most recently, all devices in service had to be reconfigured to Windows 7 minimum operating system

standard. There are 113 cellular modem cards or hotspot device required to ensure connectivity of critical devices to the County's WAN.

Approximately 150 printers are currently in service throughout the Division of Fire. In addition Fire IT is responsible for approximately 200 miscellaneous electronic devices including scanners, cameras, navigational devices, projectors, fax machines and so forth.

Replacement Program

The County initiated a "Technology Replacement Fund" some years ago to support bulk purchase of replacement equipment and normalize expenditures for division budgets. Although the Division of Fire still retains a balance in that fund, the design and administration of the fund is under revision.

Expenditures

It is difficult to determine the rate of change of the technology budget due to inconsistencies in the way these accounts are tracked and the degree to which funding comes from external sources. To some extent the number of computers operating within the Agency gives the best picture for increasing demand for technology investments. For the past several years the technology budget in the Division of Fire has declined from just over \$500,000 to an anticipated \$350,000 through 2015.

Technical Service Demand

Requests for technical support come in through a Fire Help Desk web utility, email, phone, and drop-ins. The technical services group addresses all hardware and connectivity problems and provides troubleshooting expertise when users struggle with software. Logging of service requests indicates calls are received at a rate of 100 requests per day. Management and tracking for borrow devices and temporary meeting and training setups are also provided for. The team is also responsible for setup of technology resources in support of special events and activation of the EOC and covers critical system support 24 hours a day, 7 days each week – even though the two primary technicians work M-F, 8:00 – 4:30.

Hardware

- Desktops, Laptops, MDCs, T8s, Dual Mode Tablets etc.
- Standard Software (OS, Office suite, etc.)
- Printers, Scanners, Faxes, Projectors, Document Cameras, Docking Stations etc.
- Peripherals – Docking stations, USB Drives
- Other Hardware - Digital Cameras, GPS units, UPS etc.
- MS Exchange and Activity Directory Services

Connectivity

- Facility (Wired / Wireless)
- Remote (NetMotion, Juniper, etc.)

Staffing

There are currently four technology positions assigned to the technical services team:

- 1 TSS IV Team Supervisor
- 1 TSS III Active Directory/Desktop Support
- 2 TSS II Systems Support and Management

Although recommendations for staffing of tech support services in organizations is wildly variable there is general consensus that demand is influenced by the type of business supported. When accurate demand tracking information is available, specific workload is the best way to determine proper staffing. A support ratio of about 70:1 is suitable for organizations using a single operating system on their network, plus working with established standards for the hardware installed. This Mean Value Index, established by Gartner, an independent research firm, lowers to 45:1 for networks with a number of operating systems and no hardware standards. Administrative controls, remote software deployment, remote control, and PC imaging can decrease the number of support staff required to 105:1. None of these estimates consider 24 x 7 demand. The current support ratio at Henrico Fire is about 180:1.

Current Applications

Software/Applications in use in the Division of Fire to manage information are a mix of small and large, independent and enterprise, third-party and home-grown solutions. Many applications have come into use in response to reporting requirements or one specific problem and not as part of an integrated strategy. The Agency is successful in meeting its reporting obligations but the efforts do not result in information products that are useful in guiding our organizational decisions.

Table 1 Summary of Software and Applications Used by the Division of Fire

Software or User Interface	Function	Data Source	Data Format	Location of Data	Type of User Interface/Access	Home Grown or 3rd Party Software Solution
Target Solutions	Provide training content to sworn staff.	Primarily proprietary from the software vendor but options exist for development/sharing of training aids developed by Department.		Software vendor servers.	Web Interface	3rd Party
Image Trend - State Bridge	Provide User Interface and manage deliver of Patient Care Reporting data to VA Office of EMS Servers	Incident reports/EPCR reports	Proprietary	Temporarily held on MDCs until submitted to VA State Dept of EMS Server	Interface "Field Bridge"; resides on client machine interacts with the state server "State Bridge"	3rd Party (provided by office of EMS for free of cost)
Fire Roster	Rostering tool for Fire Payroll and also a tool for dynamic personal allocation	Presently Data enter thru a manual data entry process (in-process to get data feed from HR database (oracle))	SQL Server	Henrico Server System	browser based interface available on Fire Intranet page	Home Grown
Darwin Web Interface	facilitate users to query Darwin database based on parameters selected	Henrico Data Warehouse	SQL Server	Henrico Server System	Web Interface	Home Grown
Tidemark	Used by the Fire Marshall's Office in administering Virginia Fire Code	Building Inspections database	Oracle	Henrico Server System		3rd Party

2014 Henrico County, Division of Fire Technology Strategy

Software or User Interface	Function	Data Source	Data Format	Location of Data	Type of User Interface/Access	Home Grown or 3rd Party Software Solution
WPE	Record results of Firefighter Physical Performance Evaluations	Data created by proctors	MS Access Database by Fire	Local to PC, Fire Servers or USB drive.	MS Access	Home Grown
Tier 2	Hazard Material declaration/reporting system	County Business/users with hazardous material information	SQL Server	Henrico Server System	Web interface with link on Fire Internet/intranet page	3rd Party
HIS	Inventory Management System for Fire used to manage operational supplies.	Data created by Fire Logistics and Station Personnel	MS Access 2000 Database by Fire	Fire Servers	MS Access 2000	Home Grown
Help Desk	Trouble ticket system for Fire IT	User and staff entries for technical service requests	SQL Database	Henrico Server	Web Interface	Home Grown
Red Alert	Inspection Reporting	Inspections data	SQL Server	Henrico Server	Client based interface	3rd Party
RedNMX	NFIRS Reporting Platform	Fire Incident Reporting	SQL Server	Henrico Server	Client based interface	3rd Party
CAD Online	Call Dispatch interface	CAD - Dispatch Center Data	SQL Database	Henrico Server System	Browser based Interface	Home Grown
CAD Paging	setting Paging preference platform	Fire Fighters preference to receive page	SQL Server	Henrico Server	Browser based Interface	Home Grown
CAD Passport	dynamic unit riding list for Fire apparatus	Fire Roster	SQL Database	Henrico Server	Browser based Interface	Home Grown
CAD Mobile	Provides interface for CAD data on active calls for service and receives call marks from responders	CAD - Dispatch Center Data				
Henrico Mobile Maps	Provides County-wide location information for active calls for service and responder locations	E-911; CAD - Dispatch Center Data; County GIS Data; NAVTEQ Routing Services	GIS & SQL	Henrico Server System including ArcGIS Server	Flex Viewer for GIS Application	Home Grown
ESRI ArcGIS Templates	data development template files provided by ESRI for ease of use by local governments	Data developed following ESRI Local Government Information Model database schema.	geodatabase	local, HFD server	Desktop Application	Home Grown
Fire DW (to be developed)	Fire Division's record maintenance and reporting solution	Consolidated data from various Fire Application platforms	SQL Server	Henrico Server		Home Grown
Code Red	Public Alerting system in Emergencies	?				
Oracle Time Reporting	Payroll system for Henrico County	Employees, pay & leave data	Oracle	Henrico Server	Browser based interface	Home Grown
Office Suite	Standard software package for word processing, presentations, etc.					Source Software
ESRI ArcGIS Desktop	Spatial database, analysis, and mapping	County ArcGIS server and other developed or publicly accessible datasets	primary - geodatabase	local, web, County GIS service	Desktop Application	Source Software

Henrico Fire Intranet

The Division of Fire's intranet is a very important source of organizational communication. A strong maintenance plan is critical to keep it up to date and functional. The process of Intranet management includes coordinating the roles and responsibilities of the people involved, developing common standards, setting appropriate goals and objectives, and defining the maintenance practices that will be used.

The Division's Intranet is hosted on the County server system, and is linked to other County agencies. Henrico Fire does not control the page design but can link to and provide information on County servers. Unfortunately, the Division of Fire's intranet is not up to expectations; poor maintenance of links and content resulted in inconsistency among pages, too many pages encourage poor navigation and duplication of information, and no controls on file types or document security.

Henrico Fire Internet

The Division of Fire doesn't have an independent public facing web page. The Division shares its website with all other County with minimum control on design and page organization. The Division of Fire can only edit and content of the pages via "WordPress", software for managing the content of a web page. The County is in the process of revising the website and setting standards for content and appearance. It is important for the Division of Fire to take a leadership role in designing and maintaining the content of its public facing web pages, particularly as internet provides opportunities distributing risk reduction information to the community. Assuming primary responsibility for our public web pages will require coordination and implementation effort from a qualified web developer.

Staffing

There are currently one full-time and one part-time technology positions assigned responsibility for Business Information Systems:

1 TSS IV Analyst and Interoperability Specialist

0.75 TSS IV Analyst and GIS Manager

They are responsible for coordinating interactions with County IT and vendor support, ensuring the Agency fulfills its reporting responsibilities and providing reporting and analysis services. Over the past year this team has also provided guidance for GIS development, system, process, and application improvement and will have responsibility for the design, operation and maintenance of the Henrico Fire Data Warehouse.

Status Report

County IT - Organization and Support

The Division of Fire has Project Manager BR Carson as the primary contact with County IT. His team supports the following agencies: Division of Police; Division of Fire; Sheriff's Department; Commonwealth Attorney; GIS Support. He is the primary author of the County's computer aided dispatch system or "CAD". The information managed through that system is integral to the Division of Fire's operations and response to 911 calls. The CAD data also becomes the foundation data for the Division's EMS and Fire response records.

The Division of Fire also relies heavily on the County IT team managed by Steve Guthrie. His team is responsible for Division of Police Records Management Systems, Commonwealth Attorney's Office, and Data Warehousing.

Henrico is fortunate to have the institutional knowledge of the original developers of key systems who are now in positions of leadership. They have grown and evolved with this dynamic industry during their careers in Henrico, starting their County employment in the business functions for which they now manage IT Division resources. The Division of Fire did not have internal technology expertise to contribute when Henrico's Department of Information Technology created.

The demand for technology resources is ever increasing while the staffing of the County IT Department seems to be declining. There are many advantages to in-house technology expertise not the least of which is the ability to customize solutions. As the Division of Fire develops integrated business systems and processes it will need technology expertise to guide its progress.

Current Problems

Lack of Technology Process

Too often, organizations select a database solution or product based on what it is capable of doing rather than whether it does what the association needs it to do. Chief Medical Officer, Dr. Ornato, has written "Large sets of unqualified data that have been collected for traditional reasons with little feedback will lead to failure of the data system and decreased cooperation among agencies." This principle applies in an organization as well when data is collected for data's sake and not evaluated for the business processes, decisions and interactions it enables and improves. At the writing of this document there are no processes defined to connect the Division's technology decisions to the, priorities of its mission, the Continuous Improvement Strategy or the County's enterprise technology programs and infrastructure. This lack of formal guidance allows technology to be implemented piecemeal and results in fragmented solutions, poor budget planning, and/or missed opportunities to improve efficiencies.

Lack of Standards

This lack of framework has also allowed data systems to evolve as silos not connected with each, lacking standards or proper documentation and creating the same data in multiple versions. This contributes to inaccurate and/or incomplete data. These inaccuracies limit the options for developing data into information and constrain analysis capabilities. Limited access to data sources further limit the Division's ability to use the data it collects. Versioning of similar data in multiple systems is inefficient and frustrates staff as they become responsible for maintaining the same data in multiple places. Most critically, there are essential data systems running on platforms that are expired or no longer supported by the vendor.

Lack of standards and technology decision process affect hardware as well. High variability in equipment and software increases service burdens on technology support staff, complicates troubleshooting and results in complicated logistics for supplies and implementing backup devices. The configuration, ongoing service, and maintenance obligations on an under-resourced technical services team are not factored into the cost of new systems. Two recent examples are (1) a training application that triggered reconfiguring the network and hardware setups in the stations and (2) a grant award that

resulted in 23 new CF 19 devices that must be configured in an advanced operating system not in compliance with County IT recommendations.

Flawed and Expiring Systems

These factors and others recently resulted in selection of a records management system (RMS) that does not meet the needs of the Division of Fire. The Fire RMS solution that is currently in use is fast approaching obsolescence as it cannot easily be adapted to manage the upcoming changes in national reporting requirements. Therefore the Division is expecting to begin the process of evaluating a new Fire RMS solution for implementation before the current solution expires in the coming year. In addition the system supporting Division of Fire Logistics is a MS Access 2000 system built by a sworn officer. MS Access 2000 is no longer supported by Microsoft and won't run in the County's current platform. Therefore a replacement for that system will have to be evaluated within the coming year too. Putting technology best practices into operation could help us avoid making mistakes as we seek to replace these essential systems.

Increasing Demand for Advanced Analytics

Recent in-depth evaluations (by the Division) of Fire and EMS service demands revealed information about operations in ways the organization had not previously been able to examine. The Fire Chief is looking for targeted parameters that are not currently being collected and a level of data precision and accuracy that is not currently implemented. Command staff are requesting easier access to more reliable information about response times and station personnel are asking questions about the CAD logic in making assignments and also reporting errors they find in County street and hydrant datasets. Sworn personnel are asking to share response planning information across Fire Districts and with neighboring jurisdictions and Incident Management Teams. And everyone wants to optimize smartphone technology.

Organizational Placement of Fire IT

Technology expertise within the Division of Fire is several layers of Officer supervision away from the Office of the Fire Chief. With this organizational structure, enterprise level issues raised by the Division's technology experts are passed to the Chief through the interpretations of multiple Fire Officers with limited experience in applied technology or data management. It is unlikely that Fire Officers, even with the best of intentions, can communicate complex technology issues in the same way that an experienced technology professional can. In addition, there is limited opportunity for discussion as follow-up questions have to follow the same delivery and interpretation path.

This organizational placement also impacts the ability of the Division of Fire's technology staff to influence systems and service in County IT. Services that can't be worked out at the County IT Project Manager or Specialist level have to be elevated through Fire Administration to affect response at the IT Project Manager level. And once again emphasis and interpretation errors can be introduced and there is limited opportunity for discussion of alternative solutions.

The Division's Data Activities Not Tied to Success of Operations

During the 2013 accreditation process the Commission on Fire Accreditation International (CFAI) identified that an effective performance measurement system was lacking within the Henrico Division of Fire. Managers and supervisors directing the efforts of an organization or a group have a responsibility to know how, when, and where to institute a wide range of changes. These changes cannot be sensibly implemented without knowledge of the appropriate information upon which to base decisions.

Through the self-assessment process and the on-site committee review that followed, the Division developed key documents establishing baselines for response performance and setting strategic direction for the organization. However data collection and review methods necessary to measure our successes and failures are not embedded in the fabric of the organizations operations. In addition, there are some organization functions that lack a process for assessing performance or even identification of the parameters necessary to measure success. Even the most fundamental of professional standards - response times – are not easily evaluated in a statistically sound way due to inconsistencies in the methods the Division has captured and managed this data over time.

Certain data associated with Henrico Fire responses and certain data associated with Medical responses are required for federal and state reporting obligations. Software vendors selling systems to support these reporting requirements create interest by adding data collection tools and widgets of general interest to emergency response organizations. Without a technology plan, needs assessment or technology governance program, software can be purchased that creates additional data entry work without considering the cost of data development or value of the results to the organization's priorities. Data management activities need to make sense to the end user, provide value to the organization's priorities, and not be difficult or tedious to use.

The response reporting systems currently in use at the Division of Fire for fire calls and fire inspections are RedNMX/Red Alert. The RedNMX software is used by responding firefighters to record "as found" conditions when they have responded to a call for fire service. The software handles NFIRS attribute reporting but some of the user interface controls prevent the user from entering accurate data (example of form where some value has to be entered even though parent field says no activity). Users have discovered ways around the errors and know how to enter parameters that minimize the number of forms to be completed. This data is used for monthly report summaries and other administration evaluations but it is not accessible to firefighters or field officers in a meaningful way to evaluate service demands or response goals.

The Red Alert system is currently used to manage data reports of field inspections by Henrico Fire personnel. The user interface and software setup did not include controls for business names or addresses. In addition, no one has addressed how changes in Henrico's fire zones impacted the legacy data. This inspection data could provide an important history to the inspector or investigator but the inconsistencies in business naming convention, errors in addressing, and absence of convention for tracking fire zones makes any inspection history report from this system completely inaccurate.

The Virginia Office of Emergency Medical Services (OEMS) entered into a vendor contract with Image Trend, Inc. to provide a software solution to facilitate reporting of emergency medical response information consistent with the National EMS Information System (NEMSIS) requirements. Emergency Medical Service providers are offered access to the Image Trend web-based user interface (State Bridge) to complete required reporting to the Virginia OEMS and to complete and print Pre-hospital Patient Care Reports (PPCR). The State Bridge EMS records management program is hosted by the Virginia OEMS and is used for on-line, direct access to agency records and administrative management of data. The Image Trend solution was implemented by the Henrico Division of Fire to use for emergency medical calls. This software was well received by the field personnel as it streamlined preparation of PPCRs but it is difficult to access the data for integration with other Henrico Fire information systems to perform even basic analytics.

Many members of Henrico's professional response force have found their own path to information from technology resources. Smartphones are used on the way to calls for additional information about routes, traffic and the site of the call. Aerial imagery can be used to evaluate access, resources, or options for ventilation. As resourceful as this may be, it doesn't support a common operating picture nor does it support preincident planning strategies. Similarly station computers are used for internet searches to obtain information about the community and risks in a fire zone. These methods don't incorporate County data into information development processes and may introduce new errors. For example, addresses in Google maps are not consistent with official County addresses maintained in the master address dataset.

Legal Requirements

There are legal requirements that influence the Division of Fire's management and collection of data established through portions of state and federal law. Some of these requirements are explicit and directly applicable to public safety providers and government agencies. Other legal obligations are indirectly established through the acceptance of grant monies. This section reviews some of these requirements. While it is not a complete list or intended to replace the guidance of legal advisor, it should serve to remind us that some of our technology decisions are related to legal compliance.

U.S. Fire Administration – The National Fire Incident Reporting System (NFIRS)

Federal Fire Prevention and Control Act of 1974 [Public Law 93-498]

The Federal Fire Prevention and Control Act of 1974 (PL 93-498) authorizes the National Fire Data Center in the United States Fire Administration (USFA) to gather and analyze information on the magnitude of the Nation's fire problem as well as detailed characteristics and trends. The act further authorizes the USFA to develop uniform data reporting methods, and to encourage and assist State agencies in developing data and reporting fire damage. In order to carry out the intentions of the Act, the National Fire Data Center established the National Fire Incident Reporting System (NFIRS) in the mid-1970's. State participation in the NFIRS is voluntary. Documentation for the NFIRS datasets can be found at www.nfirs.fema.gov.

VFIRS

The Virginia Department of Fire Programs (VDFFP) manages the reporting of incidents to the Virginia Fire Incident Reporting System (VFIRS). VFIRS is the statewide system for tracking all emergency responses with fire departments in Virginia. Any time fire department resources (personnel/apparatus) leave the station to respond to an incident, then the call should be reported. By reporting their incidents to VFIRS, fire departments document the details of their incidents for legal purposes and also document the overall activity with their fire department. Once incidents are reported, then summary statistical reports can be produced for use at their fire department. By reporting their incidents, fire departments get credit for all of the emergency responses that they handle in their area and also help show the value of their public service to their community.

VFIRS is an all-type incident reporting system. Fire departments should be reporting all their emergency responses to VFIRS. All types of calls such as fires, EMS, rescue, hazmat, etc. should be reported to reflect all incidents being handled.

Participation in VFIRS ensures that incident data documenting Virginia's service and demands will get proper consideration for policy and funding decisions. Incident reports submitted to VFIRS are released to the National Fire Incident Reporting System (NFIRS). From the Virginia Fire Programs website:

When you apply for federal grants, the NFIRS database is reviewed. If there is no information available for your department, then they have no data to support a decision.

By using and analyzing the incident data, information on the frequency of call types, the causes of fires, the amount of loss from fires can easily be identified to help develop appropriate fire prevention plans, to essentially help "Fight Fires with Facts".

National Highway Traffic Safety Administration – The National EMS Information Systems (NEMSIS)

Emergency Medical Services Systems Act of 1973 [Public Law 93-154]

The Federal Emergency Medical Services Systems Act amended the Public Health Service Act to provide assistance and encouragement for the development of comprehensive area emergency medical services systems. The Act provides grant monies to encourage improved Emergency Medical Services with the condition that applicants agree to maintain records and make reports as defined by the Secretary of Health and Human Services. The National Association of State EMS Directors in conjunction with its federal partners at the National Highway Traffic Safety Administration (NHTSA) and the Trauma/EMS Systems program of the Health Resources and Services Administration's (HRSA) Maternal Child Health Bureau worked together to develop a national EMS database—known as NEMSIS, the National EMS Information System, released in 2001. All 52 states signed a Memorandum of Understanding to conform to the dataset in 2003. Henrico's Operational Medical Director – Joseph P. Ornato, MD - literally wrote the reference paper cited in Introduction to the NEMSIS Data Dictionary describing the need for a National EMS Database and its future application. [[EMS Information Systems and a Future EMS National Database](#), Mears, G., Dawson, D., & Ornato, J. (2002). "Emergency Medical Services Information Systems and a Future EMS National Database". *Prehospital Emergency Care*, January/March 2002, Volume 6, Number 1, 123-30.]

The NEMSIS dataset is intended to contain a comprehensive list of all of the potential elements that would be collected about an emergency event. (e.g. Patient name, unit #, crew members, provider impression, symptoms/signs, treatment: medications & procedures, disposition, outcome, etc.) The NEMSIS dataset schema is available for download at www.nemsis.org.

The Virginia Department of Health, Office of Emergency Medical Services is responsible for coordinating an effective and efficient statewide EMS system. Prehospital patient care reports or "PPCR" data is specified by the EMS Advisory Board which also carries the regulatory authority to collect data specified for continuous evaluation in support of improved patient outcomes. The required minimum data set must be submitted to the Office of EMS and is authorized in § 32.1-116.1 of the Code of Virginia. This requirement for data collection and submission shall not apply to patient care rendered during local emergencies declared by the locality's government and states of emergency declared by the Governor. During such an incident, an approved triage tag shall be used to document patient care provided unless a standard patient care report is completed.

[The Virginia Statewide Fire Prevention Code Act](#)

Commonwealth of Virginia, Title 27, Chapter 9 [§ 27-94 et seq]

The Virginia Statewide Fire Prevention Code (SFPC) contains the regulations which must be complied with for the protection of life property from the hazards of fire and explosion.

The Board of Housing and Community Development and the Virginia Fire Services Board, through a cooperative agreement, adopt and amend the SFPC. The boards base the technical requirements of the SFPC on nationally recognized model codes and standards, and make as few amendments as possible. The boards encourage anyone who believes that a technical amendment is needed to submit their proposal to the International Code Council. Amendments made by that organization will then be considered for inclusion in future editions of the SFPC.

Enforcement of the SFPC is at the option of the local governments. The State Fire Marshal's Office has the authority to enforce the SFPC in those localities in which there is no local enforcement. Fees may be charged by both the local enforcing agencies and the State Fire Marshal's Office. The SFPC contains enforcement procedures that must be used by the enforcing agency. An administrative appeals system exists to resolve disagreements that may occur between the enforcing agencies and an aggrieved party before the State Building Code Technical Review Board.

The local governments have authority to have fire prevention regulations more restrictive or more extensive in scope than the SFPC, provided such regulations do not affect the manner of construction, or materials to be used in the erection, alteration, repair, or use of a building or structure. Henrico County Code (Chapter 11 – Fire Prevention and Protection) calls for the Division of Fire to administer and enforce the Virginia Statewide Fire Prevention Code.

Also, the following responsibilities fall under the Fire Marshal's office: issuing permits, performing safety inspections, reviewing plans for development, investigations of incidents involving fires, environmental crimes and bombings, as well as public education, public information and other related issues.

The Henrico Fire Marshal and all Assistant Fire Marshals are NFPA certified by the Commonwealth of Virginia. The office conducts an average of three hundred fire investigations annually, with a clearance rate well above the national average. Assistant Fire Marshals conduct well over a thousand business inspections each year. In the average year, they issue over a thousand certificates of occupancy, as well as permits for burning, blasting and welding. The office has a Fire Protection Engineer, who performs the review on all plans of development; these amount to several hundred a year. In addition, personnel assigned to our fire stations perform approximately three to four thousand inspections of small businesses annually.

[Emergency Planning and Community Right-to-Act of 1986 \(aka SARA Title III\)](#)

Title 42, Chapter 116 of the U.S. Code

SARA Title III was enacted by U.S. Congress in 1986 in response to an incident in India in which 2500 people were killed by a chemical release. The purpose behind SARA Title III/EPCRA has been to create a cooperative relationship among government, business, and the public involving all of them in the effort to prevent, to plan, to prepare for, and to manage chemical emergencies.

This law sets requirements for facilities that manufactured, processed, or stored certain hazardous or toxic chemicals, of certain threshold level, on-site to report annually to the state and local governments and to report any accidental releases on a timely basis. The information submitted by facilities provided the basis for community right-to-know and local emergency planning and preparedness.

The purpose of these requirements is to increase community awareness of chemical hazards and to facilitate emergency planning. This section applies to any facility that is required by the Occupational Safety and Health Administration (OSHA) under its Hazard Communication Standard to prepare or have available a Material Safety Data Sheet (MSDS) for a hazardous chemical (any chemical which is a physical hazard or a health hazard) or that has on-site, for any one day in a calendar year, an amount of a hazardous chemical equal to or greater than the following threshold limits established by the EPA:

10,000 pounds (4,500 kg) for hazardous chemicals; or
lesser of 500 pounds (230 kg) or the threshold planning quantity (TPQ) for extremely hazardous substances.

If a facility is subject to reporting under these sections, it must submit information to the SERC, the LEPC and the local fire department with jurisdiction over the facility under two categories: MSDS reporting and inventory reporting (aka Tier Two form).

[The Virginia Freedom of Information Act \(FOIA\)](#)

Commonwealth of Virginia, Title 2.2, Chapter 37 [§2.2-3700 et seq]

Through Virginia's FOIA, the General Assembly ensures the people of the Commonwealth ready access to records in the custody of public officials and free entry to meetings of public bodies wherein the business of the people is being conducted. The affairs of government are not intended to be conducted in an atmosphere of secrecy since at all times the public is to be the beneficiary of any action taken at any level of government.

The Virginia Freedom of Information Act (FOIA) is largely a procedural act, and § 2.2-3704 of the Code of Virginia guides a user as to how to make or respond to a FOIA request for public records. A "public record" is any writing or recording, in any format, prepared or owned by, or in the possession of a public body or its officers, employees or agents in the transaction of public business. For example, public records may be in the form of handwritten notes, typewritten documents, electronic files, audio or video recordings, photographs, or any other written or recorded media. Emails that relate to the public business are public records, regardless whether you use your home or office computer. Noncriminal 911 calls and associated records are generally open but you may withhold those portions of the record that contain personal medical or financial information to protect any person's safety or privacy. Under FOIA, if a record contains portions which are exempt and portions which are not, you may only withhold the portions that are exempt. Some of the records within the Division of Fire that may be exempt are personnel records; tests and examinations; vendor proprietary information software; contract negotiations; portions of engineering and construction plans submitted for compliance with the Building Code for which disclosure would jeopardize the safety of the occupants during a threat to public safety; manuals, meeting minutes or other documents that reveal security operations or planning tactics; security system designs or functions; plans to respond to terrorist activity; and health records.

Public records MUST be retained according to retention schedules set by the Library of Virginia. The length of retention depends on the content of the record. After expiration of the applicable retention period, the records may be destroyed or discarded.

Health Insurance Portability and Accountability Act of 1996 (HIPAA)

Code of Federal Regulations, Title 45, Part 160, Part 162 and Part 164

The US Department of Health and Human Services has adopted standards that apply to any entity that is a health care provider that conducts transactions in electronic form, a health care clearinghouse, or a health plan. Henrico does not bill or receive payment for health care nor does it transmit any claims or benefit analysis. As such Henrico Fire does not currently operate as a covered entity under HIPAA.

Current 24-month High-Priority Project Timeline



Fire Roster [foundation project to initiate interoperability for accuracy and efficiency]

(Multiple Components – Initiated – 10% complete: Oracle Feed Test completed)

Estimated time to completion = 12 months

Remaining Fire IT actual staff commitment = 25% FTE Shukoor

- Oracle Feed Preliminary Planning (Fire, CoIT, HR)
- Oracle Feed Web Service Development (CoIT, HR)
- Oracle Feed Test (Fire, CoIT)
- Oracle Feed Capture History for Deltas (Fire, CoIT)
- Oracle Feed Go Live Beta (Fire)
- Oracle Feed Go Live
- HIS Convert Export Pictures (Fire, CoIT)
- HIS Convert Station Day Log (Fire, CoIT)
- HIS Convert Station Org Charts (CoIT)
- Fire Roster Enhancement Preliminary Planning (Fire)
- Fire Roster Functional Fix (Revise Application) (Fire, CoIT)
- Fire Roster Appearance Fix (Fire, CoIT)
- Fire Roster Report Module (Fire, CoIT)
- Certificate Maintenance Specifications (Fire, CoIT)
- Certificate Maintenance First App Review (Fire)
- Certificate Maintenance First Fixes (CoIT)
- Certificate Maintenance Second Review (Fire)
- Certificate Maintenance Load Legacy Test (Fire)
- Certificate Maintenance Live for Kelly and CAD Passport
- CAD Passport Preliminary Planning (Fire, CoIT)
- CAD Passport Daily Roster (CoIT)
- CAD Passport CAD Paging (CoIT)

- CAD Passport Review
- CAD Passport Go Live

Mobile Device Evaluation, Selection, Implementation [6.a.1]

(Initiated: Problems with first device tested)

Deadline for completion = 9 months

Sadler

- Tablet Test Device Selection
- Configuration
- Implementation/Testing

PreIncident Planning
0.1 FTE

Pre-Incident Planning – GIS Data Development Project [7.C]

(Initiated – 60% complete: Working Group, Test Completed)

Estimated time to implementation = 3 months

Remaining Fire IT actual staff commitment = 10% FTE Patton

- Adapt test template to deploy in all stations
- Document application and prepare User's manual
- Training
- Consolidate station work into one enterprise dataset for ongoing access/maintenance/expansion

WPE Database
0.1 FTE

WPE database (Fire DW) and application [1.a.3]

(Initiated - 1st year test completed)

Unknown time to implementation - County IT application development

Remaining Fire IT actual staff commitment = 10% FTE Shukoor

- Document Project Request (Fire)
- Develop Project Specifications (Fire, CoIT)
- Database Design Fire DW (Fire, CoIT)
- Application Design (Fire, CoIT)
- Review and Test (Fire)

Office 365
?

Office 365 [6.a.2]

(Initiated – Mailbox migration for test users)

Unspecified time to full implementation – County IT

Fire IT actual staff commitment = unknown Sadler and Powers

- Clean Up and Organization of Shared Folders and Calendars
- Support for mailbox migration
- Suitability evaluation for MS Office as Cloud services (County IT is now predicting Fire will have to have license packages for shared devices)

Fire DW

0.5 FTE

Fire DW [CIS Goal 3; Supports Primary Recommendation from Commission of Fire Accreditation International]

(Not yet initiated)

Fire IT actual staff commitment = 50% FTE Shukoor and Patton

- Work with County IT to consider Fire's legal requirements, legacy datasets, and key parameters as design factors
- Work with County IT to layout Fire DW basic schema for core and legal elements
- Work with County IT to specify Fire DW constraints for vendors
- [RMS Selection Process]
- Identification of legacy data for migration
- Legacy data migration plan
- Migration of legacy Fire RMS data

Fire Inventory

0.5 FTE

Fire Inventory Supply [expired critical system]

(Not yet initiated - Current System MS Access 2000)

Unknown time to implementation – Needs Assessment Process required

Fire IT actual staff commitment = 50% FTE Shukoor

- Inventory Supply Review Current System Design (Fire)
- Inventory Supply Survey Users (Fire)
- Inventory Supply Explore Options (Fire, CoIT)
- Inventory Supply User Followup (Fire)
- Inventory Supply Document Project Request (Fire)
- Inventory Supply Develop Project Specifications (Fire, CoIT)
- Inventory Supply Database Design Fire DW (Fire, CoIT)
- Inventory Supply Application Design (Fire, CoIT)
- Inventory Supply Review and Test (Fire)

Fire RMS
0.5 FTE

Fire RMS [6.a.2: Critical System – RedNMX version out of date]
(Not yet initiated)

Unknown time to implementation – Needs Assessment Process required

Fire IT actual staff commitment = 50% FTE Shukoor and/or Patton

- NFIRS Review Schema and Validation Rules (Fire)
- NFIRS Review VDFP Validation Rules (Fire)
- NFIRS Review RedNMX Design (Fire)
- NFIRS Develop Users Group (Fire)
- NFIRS Explore Options (Fire) - *process needed*
- NFIRS User Followup (Fire)
- NFIRS Document Project Request (Fire)
- NFIRS Develop Project Specifications (Fire, CoIT)
- NFIRS Home Grown Solution or Vendor Solution?

SORC Self-Service
0.33 FTE

SORC – Darwin Self-Serve Access [Supports Performance Measurement; 3.A, 4.A]
(Not yet initiated)

Unknown time to implementation - County IT application development

Fire IT actual staff commitment = 33% FTE Shukoor and/or Patton and Powers/Farmer

- Evaluate CAD times (Fire, CoIT)
- Improvements to Darwin calculated times (Fire, CoIT)
- Incorporate mapping component (Fire, CoIT)

Fire Project Management
0.2 FTE

Fire Project Management and Continuous Improvement Strategy Status [3.c.3, 6.a.3]
(Not yet initiated)

Estimated time to implementation – 4 months

Fire IT actual staff commitment = 20% FTE Shukoor and/or Patton and Powers

- Review Current Project Management MS Access single user system
- Identify Stakeholders; form Working Group
- Document Project Request
- Develop Project Specifications

- Evaluate options (for example, MS Project Management)
- Database Design
- Application Design
- Follow up with Users
- Revisions
- Review and Test

Revise Fire IT
Help
0.1 FTE

**Revise Fire Help Database and Application [out of date and undocumented system]
(Not yet initiated)**

Estimated time to completion – 4 months

Fire IT actual staff commitment = 10% FTE Shukoor or Patton and Huy or Tri

- Document Project Request (Fire)
- Develop Project Specifications (Fire, CoIT)
- Database Design Fire DW (Fire, CoIT)
- Application Design (Fire, CoIT)
- Review and Test (Fire)

Tier II
?

Tier II Portal [Legal Requirement, Software version set to expire]

- Document Project Request (Fire)
- Develop Project Specifications (Fire, CoIT)
- Database Design Fire DW (Fire, CoIT)
- Application Design (Fire, CoIT)
- Review and Test (Fire)

Alerting
?

Station Alerting [6.B]

Sadler

- Unknown impact – station connectivity is a critical element

Fire Roster Phase II
0.2 FTE

**Fire Roster Station and Command Day Logs Shukoor [expired MS Access system]
(Not yet initiated – Related to Fire Roster and Fire DW)
Unknown time to implementation - County IT application development
Fire IT actual staff commitment = 20% FTE Shukoor and/or Patton**

- Review Current System Design (Fire)
- Survey Users (Fire)
- Document Project Request (Fire)
- Develop Project Specifications (Fire, CoIT)
- Database Design Fire DW (Fire, CoIT)
- Application Design (Fire, CoIT)
- Review and Test (Fire)

Fire Inspections RMS
0.5 FTE

**Fire Inspections RMS [CIS Goal 3, 6.a.2, Critical System version out of date, legal requirements]
(Not yet initiated - Current Red Alert Software version out of date and Legacy data needs cleaned)
Unknown time to implementation – Needs Assessment Process required
Fire IT actual staff commitment = 50% FTE Shukoor and/or Patton**

- Review Current RedAlert System Design (Fire)
- RedAlert Survey Users (Fire)
- RedAlert Explore Options (Fire, CoIT, Building Inspections)
- Fire Inspections User Follow-up (Fire)
- Fire Inspections Document Project Request (Fire)
- Fire Inspections Develop Project Specifications (Fire, CoIT)
- Fire Inspections Database Design Fire DW (Fire, CoIT)
- Fire Inspections Application Design (Fire, CoIT)
- Fire Inspections Supply Review and Test (Fire)

Ongoing Fire IT responsibilities

- Operational Systems Support 2 FTEs
- Monthly Reporting to NFIRS and NEMSIS [CIS 3.a.2] 10% FTE

Monthly Submission and
Reports 0.25 FTE / YR

- Monthly Administrative Reports [CIS 3.a.2] 15% FTE
- Fire Web Pages – convert to new format CIS [7.b.1] 20% FTE
- Fire Data Documentation [CIS Goal 3] 20% FTE
- Development of Fire Technology Policy and Procedures [CIS Goal 3] 15% FTE
- Division of Fire Technology Training [CIS Goal 3] 5% FTE

Fire Web Page Edits
0.2 FTE

Data Documentation
0.2 FTE

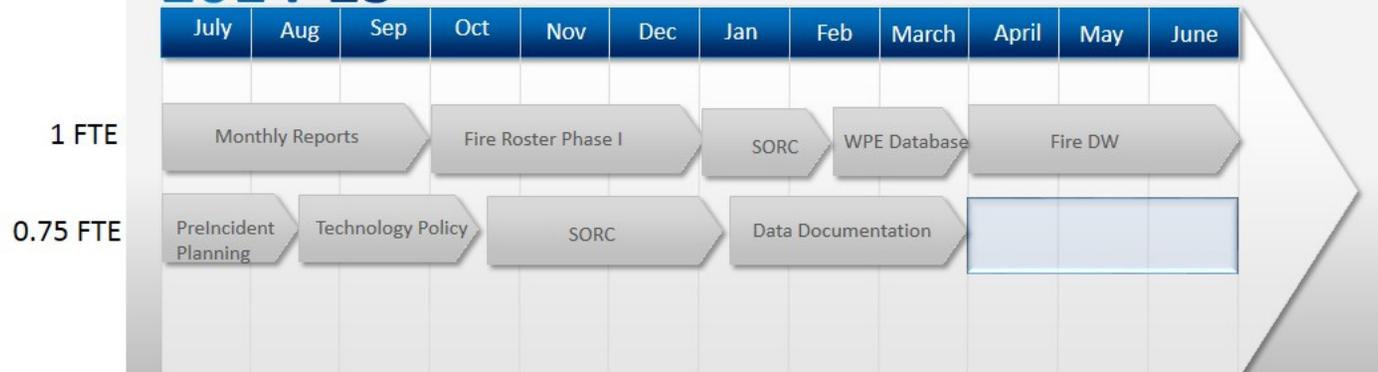
Fire IT Policy
0.15 FTE

Fire Tech Training
0.05 FTE

Data Management Staff – Current and Pending Project Time

12 Months – 1.75 FTEs

2014-15



Collaboration with County IT

The time required by County IT Developers to complete their components of these projects is not included and influences the planning of Fire IT staff time.

Data Management Staff – Current and Pending Project Time

12 Months – 1.75 FTEs

2015-16



Critical Tasks Not Addressed Using Priority of Tasks Presented in this Example:

- Project Management/Performance Measurement
- Tier II Reporting
- Station Daylogs
- Fire Inspections
- Web Updates
- Active Directory – Organizational File Management



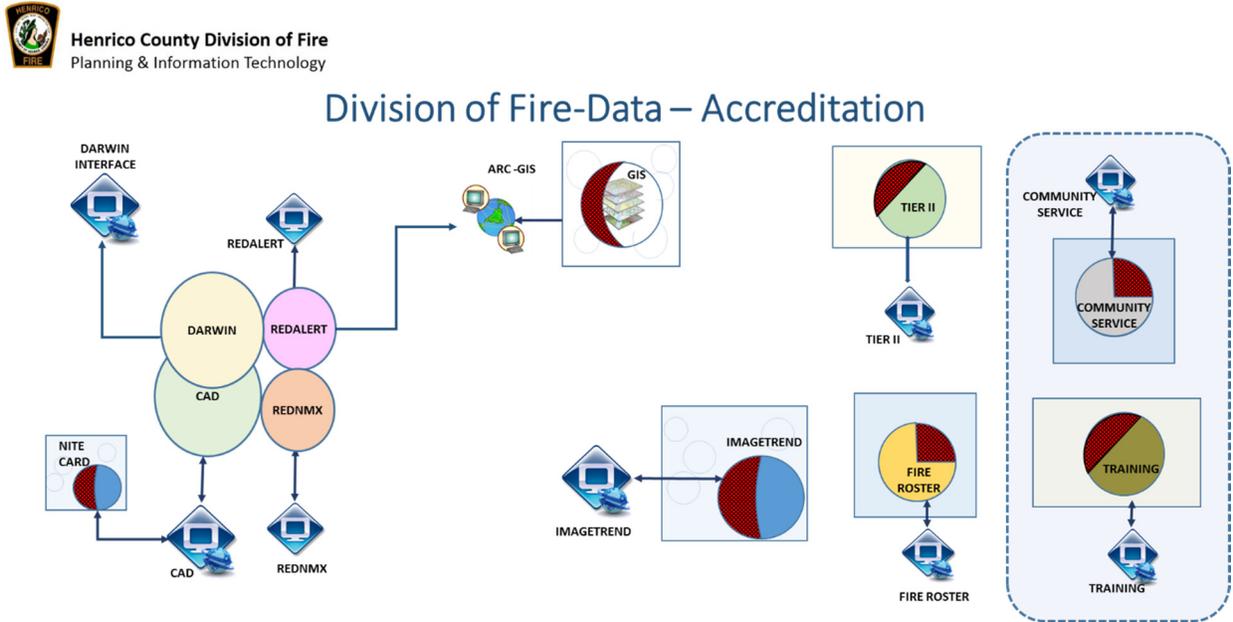
Catalysts for Change

Reaccreditation and a new Fire Chief

In the late fall of 2012, Anthony McDowell was sworn in as Henrico’s Fire Chief. Chief McDowell brings previous experience in local government administration to his position and knows the value of good data and analytics for decisions when time is not a critical constraint. At the time of his swearing in, Henrico Fire was just four short months away from the deadline to submit report documents in support of continuing the Division’s International Accreditation status. Chief McDowell established the reaccreditation project as a priority of the highest order and engaged staff at all levels of the Agency to meet the goal.

Many experienced and dedicated people came together to complete the Self-Assessment Manual, develop the Standards of Response Cover report and to synthesize the Continuous Improvement process. Incomplete, inconsistent and inadequate data were hurdles to the assessment process. The Division’s response data was divided in both storage and management – the “as dispatched data” is captured by the CAD system and then managed through the County’s SQL data warehouse while the “as-found data” is stored in various 3rd party records management systems. Some of these proprietary solutions retain the data on their server systems and others allow the data to reside on County servers but the documentation of schema isn’t provided.

Figure 2 Conceptual Diagram of Division of Fire's Data Assets



To further complicate the analysis of the Division’s data, there was no parameter or method that could be applied universally to link the data. The Division did not have an adequate level of professional technology staffing to explain the complexity of the problem or garner the credentials and access to manage procedures to facilitate use of the data.

Community Risk Assessment & Standards of Response Cover (SORC)

Henrico County Fire is an Internationally Accredited Fire Department, being first accredited in 1998 and reaccredited in 2013. Accreditation is a comprehensive self-assessment and evaluation model that enables organizations to examine past, current, and future service levels and internal performance and compare them to industry best practices. This process leads to improved service delivery.

This self-assessment process is totally reliant upon the accuracy and comprehensiveness of a local fire agency's needs, data and policies. The process requires agencies to:

- Evaluate and define a baseline of operations.
- Identify benchmarks for achieving the Agency's goals and objectives.
- Determine levels of service for all, or portions of a community.
- Measure performance over different budget or operational years.

The Division of Fire has produced regular reports of incidents and calls for service since reporting databases have been in use. The reports were mostly preformatted where the producer only needed to change key parameter values to change the output. The metadata (information about the attributes, their definition and quality) wasn't an emphasis. Generally the report process was simply 'push a button, get a report'. These practices are not unique to Henrico. In 2012 the Los Angeles Fire Department (LAFD) found itself in the middle of a public scandal associated with its data management practices and decisions made on bad or misunderstood data. Subsequent audits revealed the Department wasn't clear on the sources and manipulations behind its statistical reports. [Welsh, Ben (2012, Apr 12). Complete guide to the LAFD data controversy. Los Angeles Times. Retrieved from <http://www.latimes.com>]

The self-assessment revealed differences between "as dispatched" and "as found" data that could not be reconciled. It also showed that the quality of the data wasn't understood. For example, if a dispatched apparatus wasn't precise in declaring "in route" status it could result in a "travel time" value much less than actual. It was discovered that when new Fire Zones were implemented some of the first due values associated with address in the CAD system tables had not been updated. The response of specialty teams couldn't be evaluated because of the way the initial call was classified.

Although those statements might seem like bad news for the Agency's Reaccreditation the results were exactly the kind of outcomes the self-assessment process is meant to reveal. The process resulted in new awareness, new knowledge, new questions and new needs for the ongoing process of continuous improvement. It also resulted in a more engaging relationship with the leadership in County IT. But the assessment also revealed the status of Henrico Fire's technology program to be ill-equipped and under-resourced – both internally and in terms of support available from County IT.

ESRI ArcGIS and Spatial Data

Fire Departments have a fundamental reliance on spatial information. Where is the call? How do we get there and who can get there first? Where is the water supply? What structures are in my first-due area? What are the special community needs in my first-due area? and so forth.

Henrico County has an Enterprise License Agreement (ELA) with ESRI for the electronic mapping/spatial database software "ArcGIS". The County also runs an ArcGIS server to provide spatial data sharing between Agencies and to serve spatial information to the public. In August of 2013 Henrico attended

the Commission on Fire Accreditation International conference to accept their Reaccreditation Award. The Henrico representatives also met with representatives from the ESRI Public Safety Team. This resulted in a heightened awareness of free tools developed by ESRI specific to the Public Safety industry and started a dynamic partnership between Henrico Fire and ESRI specialists.

Preplanning is an area that Henrico Fire has wanted to improve for some time. With the new dispatch protocol implemented in 2013, there is a greater need to share preplanning information across Fire Zones. In an effort to simplify technology solutions and to take advantage of resources already present in the County, the Division of Fire began to evaluate the ESRI Pre-Incident Planning Template as an option for developing electronic preplan information that would also endure as a spatial dataset. With assistance from the ESRI Public Safety team, the template was configured specific to the data needs identified by the Division's newly formed Preplan Workgroup. The template has completed the initial round of testing at four stations and the Workgroup is developing documentation for process and an implementation plan. This solution resulted in no additional budget demand and provides a technology solution customizable and scalable to the Division's current and predicted needs.

The Henrico Fire – RIR Spring 2014 Event tested the use of ESRI's ArcGIS OnLine platform by implementing a Henrico Fire Organization Site providing GIS cloud storage and services. ESRI sent an IT Specialist to provide technical support during the event and to provide information about the services we were employing for the event to Public Safety Staff from other jurisdictions and other Divisions in Henrico.

Henrico's goals for the experiment were (1) provide a common map for Unified Command (Fire and Police) to use at the race; (2) make the common event map available via web and/or smartphone for access by field resources; (3) make the common map dynamic by allowing the Event Command Center to edit the map during the race; (4) enable the Event Command Center to track the location of staff resources during the race using AGOL. All of our goals were achieved however tracking of staff resources was attempted using personal devices and not all workers were comfortable using their mobile devices in that way. There were unexpected rewards from this partnership too. Many response personnel received hands-on training in methods and tools for locational information management. Firefighters were able to configure and deploy a damage assessment tool for an IMT training scenario and to compile the information for a briefing in 2 hours – start to finish. Perhaps most importantly, we discovered we were able to provide other jurisdictions with access to information we were willing to share through the cloud platform. This discovery provides extraordinary options for addressing the multi-jurisdictional data issue and, probably, shifts the paradigm for data management by professional firefighters. The Henrico RIR experiment was further developed by ESRI and presented as a "model organization" at the National Security Summit of ESRI 2014 Users Conference.

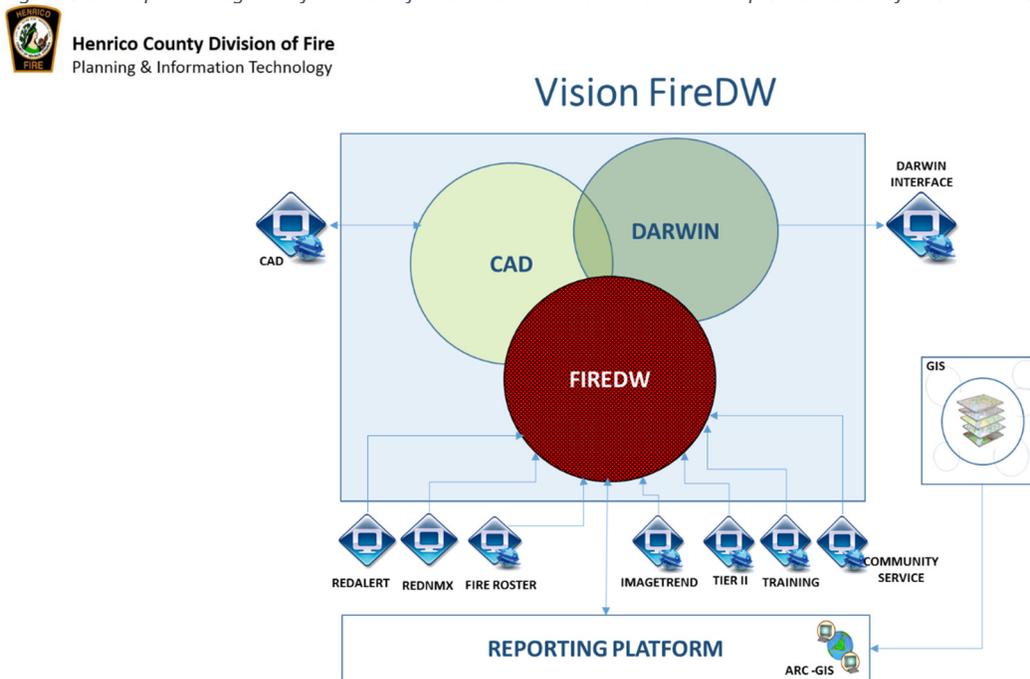
The mobile solutions we have configured and tested are verifying the power of technology to give Firefighters access to the information they need thereby converting their role from "data entry" to "information creators and collaborators". Further, the successes of the partnership between ESRI Public Safety and Henrico Fire are establishing our Division as a leader in implementing emerging technologies. We are demonstrating that our staff are well-suited for that responsibility.

Fire DW

In late 2013 the County IT Project Manager responsible for the County's data warehouse provided Henrico Fire with SQL server space to develop a database container for the sole purpose of storing and maintaining only Division of Fire data. This was made possible, in part, because the Division of Fire was able to hire a technology professional with the expertise to understand the Division's data management problems, to properly articulate the need to other IT professionals in the County, and with the qualifications to administer that responsibility.

Designing and activating Fire DW will not only give the Division the ability to efficiently use the data they have already collected but will also provide the structure and control to constrain vendor solutions to those that will easily integrate into the Division of Fire's data warehouse.

Figure 3 Conceptual Diagram of Division of Fire Access to Data Assets with Implementation of Fire Data Warehouse



Continuous Improvement Strategy (CIS)

In 2013, the Henrico County Division of Fire partnered with the Center for Public Safety Excellence (CPSE) to develop the Agency's "Continuous Improvement Strategy" (CIS). This effort engaged community members and Division representatives to critically examine the existing paradigms and to participate in the development of long-term direction and focus for the organization. This cooperative stakeholder effort resulted in the publication of "Henrico County Division of Fire 2013-2018 Continuous Improvement Strategy". This document sets forth an improvement plan to support a justifiable and sustainable future. Although technology and quality of data collection for EMS were seen as strengths, "effective use of technology" was identified as a weakness as was lack of data driven analysis and fire data QA.

The CIS is extremely valuable to any planning effort as it calls for the organization to focus on critical issues and plan improvements to identified service gaps in its path forward. Of particular importance to a technology plan are the critical issues of Program Enhancement and Business Process Improvements,

specifically with respect to the operations service model, improved planning efforts, quality assurance and integration of data. Service gaps identified during the process pinpoint areas where immediate changes are needed. Service gaps that are directly related to technology planning include records management, data and processes, and technology resources.

Elements

The internal stakeholders participating in the CIS process were tasked with developing realistic initiatives and establishing the goals and objectives on which the Division should focus its efforts going forward. These goals are intended to guide us to our desired future while reducing distractions along the way. “Processes and Data” is one of the seven initiatives and essentially connects technology in a supporting role to the other six initiatives as a function essential to business integration.

The goals established by the Continuous Improvement Strategy:

Goal 1	To develop a workforce that is prepared to achieve the mission and vision of the Henrico County Division of Fire while exemplifying the core values.
Goal 2	Enhance the County’s overall ability to prepare for, respond to, recover from, and mitigate hazards, emergencies, and disasters.
Goal 3	To develop process and data management systems that meet the current and future needs of the Henrico County Division of Fire.
Goal 4	To develop an optimized community-driven service delivery model.
Goal 5	Develop an effective and comprehensive training and certification program.
Goal 6	Utilize technology efficiently and effectively within the Division of Fire to meet current and future needs.
Goal 7	Develop a comprehensive community risk reduction model.

Discussion

As the management of information and the application of technology are essential to support the integration of analytics into the business of emergency response, each objective and task identified through the Continuous Improvement Strategy must be considered as an opportunity for business integration that could be optimized through applied technology elements.

One of the first-year objectives defined by the CIS is to “Improve planning efforts to ensure that the technology budget, implementation, and support program meet the needs of the Division.” Developing a comprehensive plan for technology is one of the tasks identified to meet that objective and this document carries out that task. The tasks for creating a technology focus group and collaborating with County IT are strategies supported by this document and described in the Path Forward section.

6C	Improve planning efforts to ensure that the technology budget, implementation, and support program meet the needs of the Division.		12 Months
	6c.1	Create a technology focus group that can help identify areas for improvement and help implement user-focused solutions.	
	6c.2	Develop a comprehensive plan that outlines the standard technology package for each station, support team and all staff officers.	
	6c.3	Develop a five-year plan, working with County IT, which will be used to guide the Division of Fire's technology program.	

Each of these items considered independently are certainly important and seem reasonable. However, considering even this single Objective, the problems that we have identified here and the absence of a technology process in the Division of Fire, it is difficult to develop any type of technology plan with meaningful detail. For this organization, and especially at this time, forming a plan for technology should incorporate stakeholders and truly establish the concept of integration. Laying down too much structure without channels for input could cause us to miss an opportunity to cultivate buy-in for new processes. Besides, technology seems to be changing with greater and greater speed and a perfect model today could be obsolete in much less than five years. At this moment, the Agency is testing tablet devices and planning for a data warehouse – both activities that could greatly affect the Agency’s technology plans within the next 12 months.

Strategic planning should be an ongoing process. The planning process is never actually complete—it is, instead, initiated. Henrico Fire has enough information and experience to layout specific strategies that will initiate a technology planning process for the Division. In fact, there are elements of a technology plan that are already in various stages of execution – like the tablet test. As the plan is put into place, new information will emerge and environments will change, which may require both wholesale changes and minor adjustments to the plan. But we should start with a vision and establish a structure. Then, through collaboration, a detailed plan can be established that also provides direction for unanticipated changes.

Task Status and remaining actions

There are additional tasks identified in the CIS that are related to technology and are in development.

7C		Develop and implement an enhanced pre-planning system.	12 Months
	7c.1	Evaluate and select an electronic preplanning solution that will meet the needs of the Division.	
	7c.2	Providing training to Division members on the use of the new preplanning system.	
	7c.3	Develop a process to ensure review, standardization, and final approval for all preplans.	

Four stations are currently testing an electronic preplanning solution. An ArcGIS template from the Public Safety Team was selected for its consistency with NFPA standards, the ability to configure (specific to Henrico Fire), control of the data created, and promotes cost-savings by capitalizing on the County’s existing investments. A Preplanning Work Group of firefighters and Fire Officers was convened to advise the configuration and to document the connection between the management of the data and the process it is intended to support. Full implementation is planned for July.

3A		Improve the use of data to inform Standard of Response Coverage improvements	12 Months
	Task 3a.1	Conduct a road network travel-time analysis to evaluate both current and future placement of fire stations and apparatus.	
	Task 3a.2	Update published monthly data reports demonstrating compliance with SORC benchmarks and other key performance measures.	
	Task 3a.3	Develop a real-time network coverage projection that will help inform apparatus move- ups during peak demand periods.	

Road network travel-time analysis has been in place since the self-assessment process of Accreditation. Henrico Fire is using the ArcGIS Network Analyst extension and the County’s road network dataset to evaluate placement of assets. This information is not easily accessed throughout the Agency or

implement to support ad hoc analysis by other than GIS practitioners – but it could be. Additional staff resources in the Division of Fire and access to ArcGIS OnLine could integrate this information throughout the Agency. Those same resources could adapt monthly SORC reports in the same way so they are also available throughout the Agency – similar to the Police web interface in TEMPO.

6A		Improve integration of technology and business practices.	24 Months
	6a.1	Implement electronic tablets as an alternative to the use of a mobile data computer in certain applications.	
	6a.2	Implement an enhanced records management system for all administrative records and files.	
	6a.3	Develop a tracking solution that will both document progress and facilitate successful outcomes.	

The focus of this document is to layout the structure for fully integrating technology and the business practices of Henrico Fire. The tablet devices obtained through a technology exploration grant have recently arrived and are being configured. One of the Fire Officers involved in that initiative correctly stated, “We can’t predict exactly how the response staff will use these but the point is to put them out there and let them show us how they can be used.” They are the first non-ruggedized device put in emergency vehicles in Henrico but they are small and sleek and people are anxious to get their hands on them. A stakeholder process to document the criteria for a RMS is necessary before the search for or design of a system is started.

Other tasks for which a technology solution may be a factor are:

Task 1c.2	Develop and implement a professional standards database.	
Task 2b.2	Develop an online tool that is easy to access and includes an overview of important planning information (i.e. road closures, weather info, ongoing maintenance like hydrant flushing or smoke testing) optimized for both internal and external audiences, across a variety of platforms	
3B	Develop enhanced processes for quality assurance and quality improvement by use of technology	18 Months
3C	Complete a comprehensive internal analysis to streamline critical processes	12 Months
Task 3c.3	Design and implement a data collection and management system to support ongoing evaluation of these processes.	
Task 4b.3	Develop and implement a tracking system that will detect and alert when there is a frequent consumer of services, enabling focused efforts to be made to evaluate and address the underlying situation.	
Task 4d.1	Create a working group to evaluate new practices and technology related to the delivery of services.	
6b.1	Install transient local area network internet service, or acceptable equivalent, at all fire stations to support training, communications, station alerting, etc.	
6b.3	Enhance wireless connectivity at all fire stations and support facilities.	
7b.1	Redesign and rollout the Division of Fire webpage. Aggressively pursue additional social media opportunities (Facebook, Twitter, etc) as a way of reaching out to the community.	

Path Forward

Guiding Principles – Vision and Values

Any strategic effort – not just a technology strategy – should establish and evangelize a foundational vision for all stakeholders. The Organization statements are presented here with proposed companion statements for Division of Fire Technology.

ORGANIZATION MISSION

“Henrico County Division of Fire is a community-driven, professional public safety and service organization that takes PRIDE in stewardship and Innovation, while maintaining public trust.”

DIVISION OF FIRE TECHNOLOGY MISSION

The chief mission of Division of Fire Information Technology is to provide reliable, innovative, high-quality technology solutions and service that support Henrico County’s Fire and EMS responders in their mission to protect lives and property and advance public safety in the communities they serve.

ORGANIZATION VISION (EXCERPT FROM 2013-2018 CONTINUOUS IMPROVEMENT STRATEGY)

“Our department and communities will be better served by virtue of our greater utilization of technology and its advances. We recognize the importance of stewardship and will foster greater efficiency and effectiveness through the enhancement of data management processes and optimization of our service delivery model. “

DIVISION OF FIRE TECHNOLOGY VISION

- Provide a stable and scalable platform for delivery of technology services to support the business and program priorities of the Henrico Division of Fire;
 - Ensure or enhance continuity of operations
 - Protect and secure critical data
 - Comply with legal requirements for data collection and management
- Eliminate or improve technology systems that hinder our responders in performing their duties or interfere with the success of their mission;
 - Eliminate duplicative effort
 - Avoid data redundancy
 - Prevent versioning of source data except where connectivity is unreliable
 - Strive for reliable and responsive hardware and connectivity systems
 - Focus responder efforts for data collection and maintenance on information that has been identified as essential to the Division of Fire
- Reduce the complexity of our technology environment;
 - Streamline the delivery of information or services by promoting consistency and standardization
- Seek technology solutions that reduce the total cost of ownership of information technology and aid in streamlining the businesses processes they are intended to support;
 - Promote cost-savings or cost avoidance
 - Capitalize on the County’s existing investments in applications and technology
 - Document the connection between the management of data and the business process it is intended to support
- Facilitate increased interoperability of data systems and devices;

- Linking to dynamic data is preferred
- County IT manages ETL processes; Manual exports and uploads are to be avoided
- Division of Fire data warehouse structure incorporated as a mechanism to drive interoperability
- Increase the flexibility and responsiveness of technology systems to the changing needs of the County and its residents.
 - Innovate to increase productivity or enable greater workforce mobility

Initial strategies

It is important to layout broad goals and provide framework because no structure currently exists for integrated technology and decision support from business analytics. We need to build a common vocabulary for administrators, program managers, operational staff, and IT professionals to ensure IT-related investments are in line with business strategies. This is actually a best practice commonly referred to as “IT Governance” and is often managed as a key business function in highly regulated industries.

IT Governance is called for when

- IT investments do not support the business strategy or provide expected value
- There are too many projects, which results in inefficient use of resources
- Projects are often delayed, run over budget, and/or do not provide the needed benefits
- There is an inability to cancel projects when necessary
- The enterprise needs to ensure compliance to industry or governmental regulations

Effective governance starts with the leadership, commitment and support from the top. This document seeks approval and endorsement from the Fire Chief and includes recommended actions. The strategies recommended here are intended to move the organization to

- Clear and consistently applied processes for technology planning
- Increase understanding of executive, business and IT roles and responsibilities
- Development of relevant information and organization structures

Establish a Collaborative Structure for Implementing a Program of Technology Governance

Consistent with the Continuous Improvement Strategy:

CIS Goal 6 “Utilize technology efficiently and effectively within the Division of Fire to meet current and future needs.”

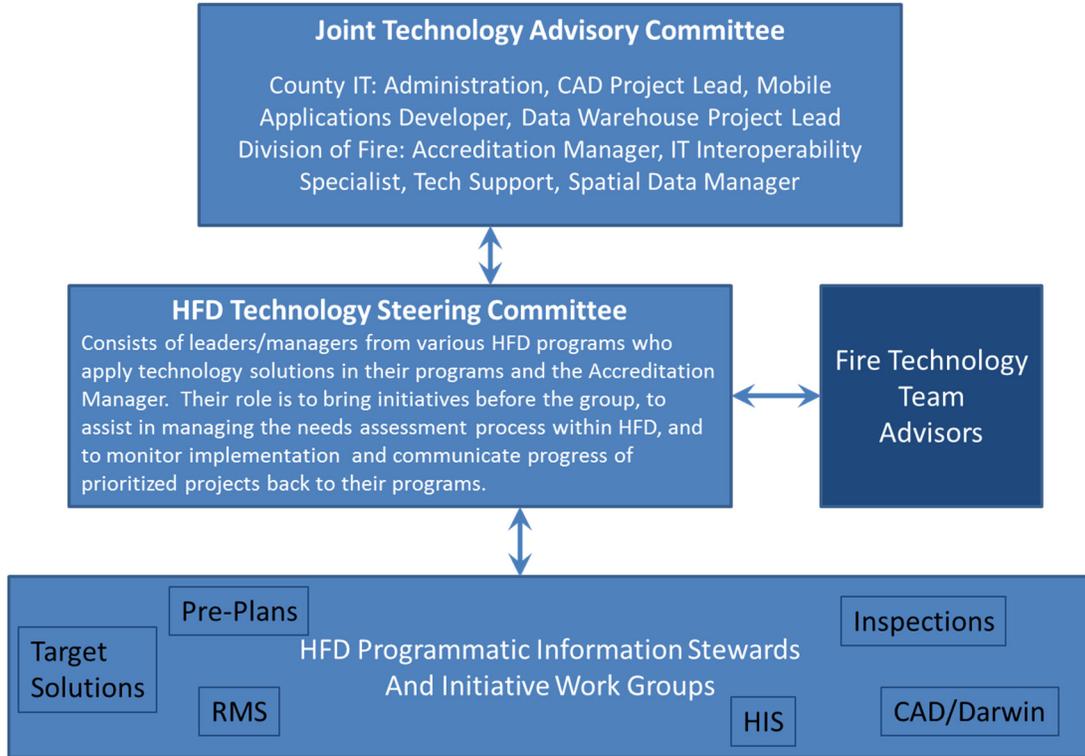
Objective 6A “Improve integration of technology and business practices.”

Objective 6C “Improve planning efforts to ensure that the technology budget, implementation, and support program meet the needs of the Division.”

It is requested that a policy implementing Technology Governance in the Division of Fire be ordered through the authority of the Fire Chief. Technology governance is a best practice for Information Technology operations in successful organizations and is necessary to establish a cross-functional

decision process to create technology policies, guide processes, and facilitate standards to optimize the value of the Division’s technology assets.

Figure 4 IT Governance Structure Proposed for the Division of Fire



Joint Technology Advisory Committee

Consistent with the Continuous Improvement Strategy:

Task 6C: Develop a five-year plan, working with County IT, which will be used to guide the Division of Fire's technology program.

It is requested that the Division of Fire formalize seating of a Joint Technology Advisory Committee with membership from the County Department of Information Technology and the Division of Fire. The recommended membership of the Committee is:

County IT: Administration, CAD Project Lead, Mobile Applications Developer, Data Warehouse Project Lead

Division of Fire: Accreditation Manager, IT Interoperability Specialist, Technical Services, Spatial Data Manager

The responsibilities of the JTAC will be:

- Provide strategic direction for the Division of Fire Technology Program.

- Provide guidance on policies, standards, and procedures to drive business/technology improvements across Division of Fire programs and sections (ex. Needs Assessment Process).
- Prioritize and approve master data initiatives against budget and resource constraints.
- Assist with system interoperability and integrated solutions that cross County agencies.
- Work with the Division of Fire to measure and monitor effectiveness of technology programs.
- Delegate activities/tasks to HFD Technology Steering Committee.

In preparation for this document representatives from County IT were asked to meet with representatives from Fire Technology. County IT was asked to help guide the Division of Fire as it set out to develop a five-year plan. As professionals in their field, they understand the dynamic nature of applied technology, especially now as mobile devices and cloud computing are significantly changing the landscape. They recommended that we focus on our immediate technology needs but agreed to continue working in a collaborative group with Henrico Fire to help manage the future. The input from this initial process revealed that County IT struggled to understand the service priorities and needs of the Division of Fire. But other than the DPS 120 form, “User Request for Support Services” and a “Geocentric Policy” requiring “location aware” enterprise architecture, there is little available to guide technology process within Agencies.

The key considerations the County IT representatives identified were;

- Requests for County IT service coming from multiple programs and representatives in the Division of Fire.
- Purchases off state contracts and through direct vendor contacts bypass oversight and guidance from County IT thereby ignoring standardization requirements and constraints of existing systems.
- Implementation of a Fire Data Warehouse schema could be used to constrain software services consistent with existing data, processes and systems.

Division of Fire Technology Steering Committee

Consistent with Continuous Improvement Strategy:

Task 6C: “Create a technology focus group that can help identify areas for improvement and help implement user-focused solutions.”

It is requested that the Division of Fire formalize a Fire Technology Steering Committee

The Technology Steering Committee is to be established by the Fire Chief to advise policy, document objectives, plan budgets and establish priorities for Division technology issues. Membership of the committee must include representation from the 'business owners' of master data - those responsible for running the business and establishing the procedures of the organization. Participation in this group by representatives from Henrico County IT is desired. It is essential to also include representation for those with data quality responsibilities within the HFD organization in order to provide visibility and importance to data quality initiatives. This Committee will be facilitated by HFD Planning and IT team and the technology professionals will provide guidance and research to the Committee. The Steering Committee serves as the clearing house for new technology solutions in the Division of Fire – hardware

and software. It sets technology priorities for the Division of Fire with guidance from the Technology Advisory Committee.

Responsibilities include:

- Providing strategic direction for technology investments and ensuring coordination with CIS to support the Division’s mission and goals.
- Developing, collaborating and implementing policies, standards, procedures to drive improvements and efficiencies across the organization.
- Reviewing, prioritizing and recommending master data management projects, analyzing funding needs, and requesting approval from Joint Technology Advisory Committee (JTAC) when required.
- Resolving day-to-day process issues (procedures and documentation) in coordination with the Information Custodians and with the guidance of the Division’s Interoperability Specialist.
- Developing training plans, training materials and coordinating training activities related to technology and master data processes.
- Delegating activities/tasks to user committees or other designated staff.
- Measuring and monitoring effectiveness of technology solutions and providing feedback to the JTAC.
- Incorporating technology planning into the fabric of the organization’s culture and core functions.

The first priority of the Steering Committee is to develop and implement a Technology Needs Assessment Process. Much of this work has been accomplished within the context of this document.

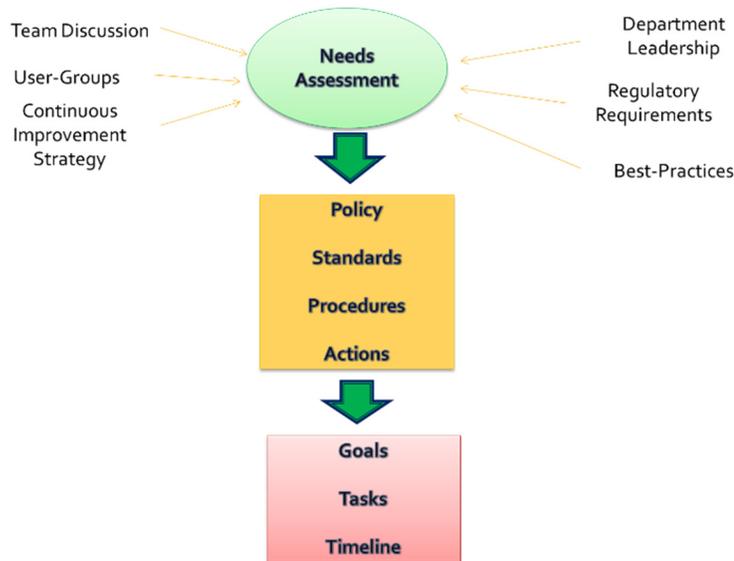


Figure 5 Proposed Fire Technology Governance Process Introduced to County IT Leaders

Division of Fire Technology Users Groups

Consistent with the Continuous Improvement Strategy:

CIS Goal 4 “To develop an optimized community-driven service delivery model.”

And to aid in

Objective 4D “Formalize a research and development doctrine for the Division of Fire.”

4D Task: Create a working group to evaluate new practices and technology related to the delivery of services.

A structure and process for creating Division of Fire Technology Users Groups should be implemented.

Data stewards are the business and IT subject matter experts who can most effectively translate how data and systems influence the business processes, decisions and interactions most relevant to the organization. The business stewards must be IT-savvy; the IT stewards must be business-savvy. Both must be strong communicators and facilitators across the part of the organization they represent. It consists of the front-line operations, administrators and IT stakeholders who put data governance into operational practice. They ensure ongoing compliance with and support for the stated policies and objectives and are instrumental in communicating process, evaluating solutions and ensuring buy-in throughout the organization.

Users groups are established by the Steering Committee and can be project based or program based and short term or ongoing. They can be requested by the user community, technology team or administration. Users groups are responsible for assisting in the development of data standards and procedures and reporting on maintenance issues. They provide leadership to other users – training, compliance, troubleshooting.

[Reorganize Fire IT and Staff at an Appropriate Level](#)

Consistent with the Continuous Improvement Strategy:

CIS Goal 1 “To develop a workforce that is prepared to achieve the mission and vision of the Henrico County Division of Fire while exemplifying the core values.”

CIS Goal 2 “Enhance the County’s overall ability to prepare for, respond to, recover from, and mitigate hazards, emergencies, and disasters.”

CIS Goal 3 “To develop process and data management systems that meet the current and future needs of the Henrico County Division of Fire.”

CIS Goal 4 “To develop an optimized community-driven service delivery model.”

CIS Goal 5 “Develop an effective and comprehensive training and certification program.”

CIS Goal 6 “Utilize technology efficiently and effectively within the Division of Fire to meet current and future needs.”

CIS Goal 7 “Develop a comprehensive community risk reduction model.”

The Planning and Technology group in the Division of Fire should be reorganized to create a Fire Information Technology Department. In addition, a request should be made for additional County IT resources to be embedded in the Division of Fire to provide support and ensure a collaborative process for pending critical projects (Fire DW and self-service reporting).

Technology is changing in ways that make it more accessible – software companies are providing widgets and templates to push options for development to the user level, mobile apps provide information in a heartbeat. The professional firefighters in Henrico have demonstrated that they are able to seize technology opportunities and take advantage of what they offer. They are quickly transitioning from consumers of data to developers of information. There are critical systems within the Division of Fire that are no longer supported and demand for technology in the Division of Fire is on the rise. There is not an adequate staffing level to meet that demand. The Division needs help with design and implementation of Fire DW and resources to fulfill the demand for new types of reports and analysis through user apps and mobile devices.

A position of technology leadership, staffed with an experienced IT professional, should be created in the Division of Fire. This position should report to the Fire Chief or a Deputy Chief to elevate the organizational importance of technology in the Division of Fire to a level commensurate with leadership in County IT. If an organization wants to be sure to capture critical opportunities to leverage data to support mission, operations, strategy, and decision support, it needs to recognize the technology function at the enterprise level of the organization. The current organizational level of technical expertise in the Division of Fire is not at a level for negotiations with enterprise management positions in County IT.

Figure 6 Recommended Staffing for Fire Information Technology Program



County IT

1 Application Developer (NEW for Darwin team in County IT but embedded in the Division of Fire – could be shared with Police)

Fire IT

1 Technology Leadership Position (NEW)

4 technical services (without phones)

Or

5 technical services (with phones – add 1 NEW TSS for phones, mobile apps, and active directory, create “Shop Manager” from existing TSS)

1 Business Analytics specialist - SQL reports

PT GIS Manager with additional database experience

PT Reports and Reporting specialist

[Temporary and/or part-time positions should be used as a point of entry to full-time classified positions in order to test fit of individual skills to the Division of Fire’s developing need.]

As the Division of Fire takes more responsibility for its data assets there will need to be a technology leadership presence in the Agency ensuring that staff know how to use the database systems; ensuring that all Agency data is being collected and managed in the central data management system, and to understand the business functions and technology needs of the organization. This position would have primary responsibility for communicating the Division of Fire’s technology priorities to County IT and shepherding the development of technology policies and procedures within the Division.

This leadership position would coordinate needs analysis and users groups for Fire’s priority projects to guide the details of design and specifications. Furthermore, a technology professional at the management level in the Division of Fire could provide input for the budgeting process and advise grant proposals for creative funding that could benefit both the Division of Fire and County IT.

The most successful organizations are those that have taken the time to document their business processes and to provide organization-specific technology training to their staff - standards the Henrico Division of Fire wants to achieve. A technology manager is a key component for this process and should lead staff to create the documentation and training that will be used throughout the life of the databases used in the Agency. A big challenge for IT governance will be ensuring that staff use the central database for all of the data being managed to support the organizations decisions. A technology position at the leadership level will be able to identify ‘rogue databases’, find out how this information is being used, and work with the staff to get that information back into the central system.

The business analyst needs to synthesize the organizations mission into data management systems and strategies and develop clear, concise reports to inform organization decisions. For example, the Division of Fire may have a strategy to increase engagement of the broader public. Given that mission, the business analyst will ask “how can we use the database and the data we have to address that objective?” Technical leadership experienced in business analysis will also guide discussions to evaluate whether a proposed technology solution is actually automating bad process. Bad process automated will continue to give you the wrong information.

GIS is a significant technology element in the Division of Fire now and will be fundamental for many of the objectives already identified. County GIS has said that the Division of Fire needs to hire a “full-time GIS manager”. At present there is a part-time position in Fire IT that supports the Division’s GIS needs and acts as the GIS manager. Demand for the GIS services and applications is on the rise in the Division and ultimately full-time staffing may be required. There are two types of experience in GIS specialists – those that manipulate the geometry and attributes of map data and those that use GIS as a data

management utility to gather, view and manipulate spatial data and data in other systems. The latter is the type of experience that the Division of Fire will always need.

The Division of Fire's staff-issued phones are currently assigned and managed by administrative support staff. The majority of these devices are smartphones that connect to the County's enterprise technology systems. Mobile GIS applications have been developed in the Division of Fire and successfully deployed on smart phone devices for pre-incident planning, drafting site collection and to provide a common operating picture for special events. Additionally the Division recently initiated a project to evaluate and test implementation of mobile tablet technology. A position is needed in Fire IT to manage and maintain mobile devices and assist in development and implementation of lightweight mobile and web apps. This person would be responsible ensuring success as phones are transitioning to mobile devices through standardization and proper configuration. This position could also have primary responsibility for maintaining internal and external web pages consistent with County IT's software and design standards.

The staff that provide systems support through the technology shop is overwhelmed by constant demand. So much so that they are unable to reliably participate in technology planning meetings or communicate hardware and operational issues that only they can predict. Additionally they quickly respond to every request but cannot quantify demand or record diversity of requests. By providing a position of informed management for technical systems support there would be an ability to monitor and manage demand and prioritize competing needs. The position would also guide hardware decisions and manage configurations in cooperation with County IT while providing additional technical services to support the 24 x 7 demand.

Develop Needs Assessment Process

Consistent with the Continuous Improvement Strategy:

CIS Goal 6 "Utilize technology efficiently and effectively within the Division of Fire to meet current and future needs."

Objective 6A "Improve integration of technology and business practices."

Objective 6C "Improve planning efforts to ensure that the technology budget, implementation, and support program meet the needs of the Division."

And to aid in

6A Task: Implement an enhanced records management system for all administrative records and files.

6A Task: Develop a tracking solution that will both document progress and facilitate successful outcomes.

The first priority of the Steering Committee will be to develop and implement a Technology Needs Assessment Process for the Division of Fire.

Needs Assessment (From Wikipedia)

"A needs assessment is a systematic process for determining and addressing needs, or "gaps" between current conditions and desired conditions or "wants". The discrepancy between the

current condition and wanted condition must be measured to appropriately identify the need. The need can be a desire to improve current performance or to correct a deficiency.”

The Needs Assessment Process for any particular requested solution or identified problem should be developed such that it:

- 1) Is completed by a group through a single convening authority (The Division of Fire Technology Steering Committee) to
 - a. Include a diversity of ideas.
 - b. Focus intent and purpose.
 - c. Fosters quality assurance/buy-in.
- 2) Determines who will benefit from the requested solution.
 - a. State the problem(s) to be addressed or Agency objective(s) supported by the solution.
 - b. Document the current workflow processes (How do things work now?)
 - c. Identify connections to other problems in other Division programs.
 - d. Identify how final product as applied to the desired outcome would perform.
 - e. Determine the level of technical competences of users and the general availability of resources needed for development and implementation process.
- 3) Identifies and documents all components of the problem (Looks at work flow process of target audience and identifies when a technology solution will serve as a force multiplier or improve efficiency and when a process improvement is better than a technology solution.)
 - a. Identify the business process or function(s) that could be impacted
 - b. Evaluate - Process problem or Technology Problem?
 - c. Does it impact the Agency’s compliance with legal requirements, contractual obligations or relate to other County Agencies?
 - d. Does it create new obligations, administration, or maintenance costs?
- 4) Culminates in a recommendation report that can be used by the Division to improve process and/or to document a request to Technology TAC that can be used to start the design/evaluation process with County IT.

Develop and Implement Division of Fire Data Warehouse

Consistent with the Continuous Improvement Strategy:

CIS Goal 3 “To develop process and data management systems that meet the current and future needs of the Henrico County Division of Fire.”

Objective 3A “Improve the use of data to inform Standard of Response Coverage (SORC).”

Objective 3B “Develop enhanced processes for quality assurance and quality improvement by use of technology.”

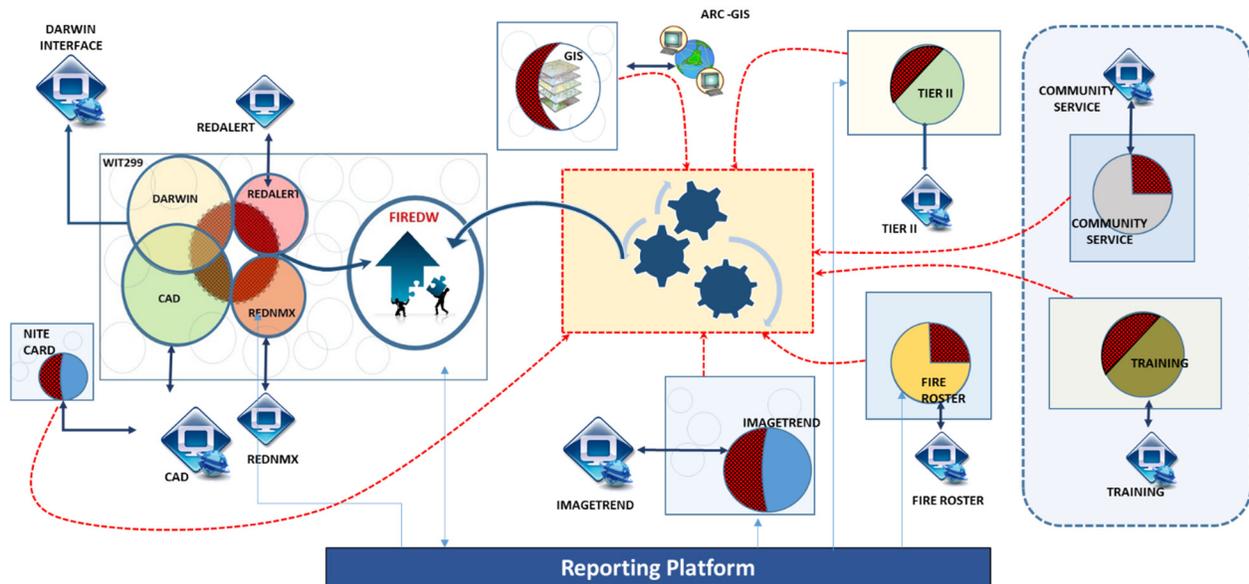
And to aid in

3A Task: Update published monthly data reports demonstrating compliance with SORC benchmarks and other key performance measures.

3B Task: Develop a formal electronic template to facilitate a standardized after-action review process and help convey key lessons learned.

It is recommended that design and implementation of the Division of Fire Data Warehouse be identified as a high priority for the Division and that the required resources are requested to ensure its success. Having received the authorization to develop Fire DW, there is a great deal of work required to make it an effective reality. The Division of Fire will need additional support from County IT to design the database schema, develop ETL utilities, document, and prepare user interfaces for queries and reports.

Figure 7 Building a Division of Fire Data Warehouse



The Division of Fire Data Warehouse will service the Division's unique data needs. This will allow the Division's Data Managers to manipulate or link data from other platforms that Division of Fire owns/uses. For example, we are not currently able to link "as dispatched" to "as found" data efficiently. Additionally it will allow the Division of Fire to enforce rules on data quality, consistency, integrity, and documentation specific to our organizational needs. This database will also help us in our efforts to eliminate data redundancy and prescribe compatibility for vendor contracts (as recommended by County IT).

This task can also provide a foundation for ad hoc SORC analysis through web utilities developed with the Darwin team.

Connect data management duties with response operations to promote ownership and responsibility for technology solutions

Consistent with the Continuous Improvement Strategy

CIS Goal 3 "To develop process and data management systems that meet the current and future needs of the Henrico County Division of Fire."

Objective 3A "Improve the use of data to inform Standard of Response Coverage (SORC)."

Objective 3B "Develop enhanced processes for quality assurance and quality improvement by use of technology."

CIS Goal 4 “To develop an optimized community-driven service delivery model.”

Objective 4A “To enhance to the Standard of Response Coverage through continuous improvement and planning.”

And to aid in

CIS Goal 7 “To develop an optimized community-driven service delivery model.”

Objective 7A: “Develop and implement a system to ensure greater focused community outreach.”

Objective 7B: “Develop and implement a system to ensure greater marketing and communication.”

Objective 7C: “Develop and implement an enhanced pre-planning system.”

To encourage ownership of technology solutions, it is recommended that end users be included in committees for technology needs assessments, evaluation of technology solutions, and development of standards and procedures. Field operations staff should be encouraged to provide input to Fire IT to define what type of access to what type information is needed to inform and improve response, develop greater community outreach and ensure greater communication between staff and their communities. Implementation of Office 365 should be tailored so that it does not constrain field staff from opportunities to collaborate through technology solutions such as Outlook’s exchange mail service and Share Point.

This idea has been recently applied with success through the creation of a GIS committee for Pre-Planning initiative. This group (a Battalion Chief, two Station Captains, two Firefighters, and Fire Planning) has collaborated to develop a plan for phased implementation of a scalable electronic preplanning solution and is currently testing the design and developing standards and users manuals for County-wide deployment. The committee agreed to design the first phase as a small-scale data collection effort to gather the most important elements and evaluate the performance of station staff in creating this data.

Implement Standardization

Hardware Standards

Consistent with Continuous Improvement Strategy

Task 6C: “Develop a comprehensive plan that outlines the standard technology package for each station, support team and all staff officers.”

The variability and complexity of devices in service complicate maintenance strategies and increase the demand on technical support services. Introducing standards for technology purchases would help reduce this burden. Often grant opportunities rise up quickly and have tight deadlines so a technology systems specialist should be a member of the Division’s grant committee to provide guidance for those circumstances.

The technology systems specialists have drafted a standard technology plan using their skills and experience. However, the proposed plan doesn't include input from stakeholders – including Fire Officers in positions of authority that may feel boxed out of expressing their views. The plan could be implemented as is but... in the context of review by the Technology Steering Committee, synthesis of the plan's logic could be communicated and individuals will be forced to consider their wants in the context of the organization's needs.

Laptops are the preferred solution for future computer purchases based on the experience of the Fire IT specialists. They are easy to drop off for repairs and a substitute device can be configured for pick up at the same time. In addition, the portability of the devices will reduce the demands on an Agency loaner system for portables and also minimize the configuration changes in stations that complicate positioning of desktop devices.

Network printers are the preferred printing solution. Standalone printers cannot be supported remotely and often result in stocking issues for logistics for odd models.

Recommended Hardware Standards:

Stations with 1 or 2 companies	1 GIS desktop in the Captain's office (to serve the needs for both GIS and Officer In Charge performance appraisals)
	2 laptops will serve as multi-purpose devices (training on large screen TV, data entry, specialty shop internet access)
	1 network printer
Stations with 3 companies	1 GIS desktop in the Captain's office (to serve the needs for both GIS and Officer In Charge performance appraisals)
	3 laptops will serve as multi-purpose devices (training on large screen TV, data entry, specialty shop internet access)
	1 network printer
Specialty Teams	1 laptop each
Logistics	Captain – mobile tablet type All others - desktop
Command Staff	1 mobile Toughbook 1 PC connected with dual monitors or single monitor with TV
Chief Officers	1 mobile tablet type with air card
FMO	1 mobile Toughbook with air card
Administration/Training staff	1 desktop or laptop specific to assignment

Software Standards

The agencies responsible for both NEMSIS and NFIRS document and publish their database schemas. Data solutions implemented in the Division of Fire should be required to comply with those published standards and to make the data developed by the Division freely accessible in that format.

Industry Codes and Standards recommended by Professional organizations such as National Fire Protection Association, International Association of Fire Chiefs should be incorporated too. The Division of Fire should advance policies and procedures for data development and exchange consistent with NFPA 950.

Data dictionaries and database schemas should be required for all databases. At present there is no standard database documentation for CAD or Darwin and it is lacking for some of the legacy systems used by Henrico Fire. Portions of these systems that are important to the Division of Fire may have to be documented by the Division's technology resources.

Software standards should be fleshed out under the authority of the Technology Steering Committee and with guidance from the JTAC.

Training and Users Manuals

Consistent with the Continuous Improvement Strategy

Objective 3B "Develop enhanced processes for quality assurance and quality improvement by use of technology."

It is recommended that a more comprehensive technology training plan be developed and implemented that includes software users manuals particular to the Division of Fire business processes they support. Initiating a new paradigm where technology is truly integrated with the business processes of the organization entails a period of learning how to work in a totally different way. This will only succeed if the "hows" and "whys" of what is required are communicated regularly and the objectives and standards are well documented.

The training program for new recruits should present the information architecture and technology vision for the organization, provide details about data entry responsibilities, include contacts for problems/questions, and provide recommended resources for research about the community and success of operations.

Refresher technology courses should be initiated when new standards are developed or new software is implemented.

Transition to a Fully-Integrated, Fully-Connected Mobile Response Organization

Consistent with the Continuous Improvement Strategy

Objective 2B "Enhance information sharing and common operating picture awareness both internally and externally."

And to support

Objective 4C "Develop improvements for enhanced command and control."

Task 4c.1 "Develop a fully functioning Type IV incident management team using Henrico County resources."

It is recommended that the Division transition to a fully mobile-enabled technology platform to provide staff access to data and applications that support the response mission, on any device, anywhere, at any time, on any network.

Mobile data terminals (“MDTs”) or mobile digital computers (“MDCs”) have been in use in Henrico for almost 10 years and are widely and successfully employed in the emergency response industry nationwide. This strategy is intended to build upon those successes and advance our operational technology to the next level where mobile devices link all response staff and provide a platform for data sharing and collaboration. Maintaining continuous situational awareness is now generally accepted as the foundation for optimizing public safety services.

The professional firefighting staff of Henrico County is becoming more and more technology proficient with each recruit class. Most responders will describe using their smartphones en route to evaluate the response site, traffic and routing, staging locations, even venting or access options. If you can think of a mobile phone use that might support response efforts, chances are ‘there’s an app for that’. The problem with ad hoc, self-service technology solutions is that they are very one-dimensional in application. The information harvested usually supports an individual for a particular decision and does not, generally, contribute to a common operating picture or advance shared information in the organization. Custom mobile apps are becoming easier to build and deploy in support of specific tasks or functions. These applications can be easily configured and can be quickly accessed, understood, and shared to support coordinated actions. These efforts, however, require technology professionals in the organization to assist in documenting what the first responders need, identifying how a solution can be best deployed, and to provide assistance in configuring templates or coordinating a development process to make sure the end product will be a force multiplier in supporting mission objectives.

During the self-assessment component of the 2013 reaccreditation process, the firefighting staff showed they are ready, willing and able to collaborate to improve processes and performance. Currently response staff on shift assignments are not connected to the Agency’s enterprise mail and information sources unless they are logged onto a station computer. Emails can be accessed through a web-client but shared folders for projects are not accessible. Opportunities for electronic cooperation on projects should increase as the County moves to cloud-based services for Office and other digital information but a device and an internet connection are still required. Providing tools for collaboration accessible by all Division staff must be a priority as these cloud services are implemented.

Future and Purpose

Henrico’s professional firefighting staff is already successful but they continuously strive for excellence. It is evident in their record, it is evident in their training and education, and it is evident in the contribution they make to their communities. Firefighters are, at their core, problem solvers – without the proper tools and in drastic conditions, they will find alternatives. They will continue to be successful agents of public service regardless of the technology resources available to them. Similarly the professional civilian staff that support the mission of the Division of Fire will continue to do their level best to provide for our agents of public safety. But with technology we have an opportunity to better measure our risk, to better evaluate our performance, to make our communities and responders safer while optimizing our decision processes.

The Division has set an intention for incorporating technology strategies into the culture of the organization. The difficulty of our path forward and the trueness of our aim depend on the timing and successful implementation of the strategies recorded in this document. In any event we are certain to be leaders in this journey because we have established our vision and are prepared to manage the necessary changes.

Appendix A – References

National Fire Protection Associations (NFPA) Codes and Standards

<http://www.nfpa.org/codes-and-standards>

NOAA Needs Assessment Guide

<http://csc.noaa.gov/needsassessment/#/>

Rightsizing your Help Desk Team

<http://www.golime.co/blog/bid/171526/Rightsizing-Your-Help-Desk-Team-Part-1>

Staffing the Desktop Support Function: How Many Technicians Do You Need?

<http://www.thinkhdi.com/~media/HDIConf/2013/Files/Speakers/MetricNetsOptimalStaffingforDesktopSupport.pdf>

Complete Guide to the LAFD Data Controversy

<http://timelines.latimes.com/lafd-data-controversy/>

NFIRS

<http://www.usfa.fema.gov/fireservice/nfirs/>

NEMESIS

<http://www.nemesis.org/>

ESRI

<http://www.esri.com/> and <https://geonet.esri.com/community/public-safety>

Alpine Software

<http://www.alpinesoftware.com/>

Virginia OEMS – State Bridge by Image Trend

<https://vphib.vdh.virginia.gov/>

VFIRS

http://vdfp.virginia.gov/fire_data_statistics/vfirs_training.htm

Appendix B – Legal Requirements for Data Management

The Virginia Freedom of Information Act

Commonwealth of Virginia, Title 2.2, Chapter 37 [§2.2-3700 et seq]

§ 2.2-3704.D. Subject to the provisions of subsection G, no public body shall be required to create a new record if the record does not already exist. However, a public body may abstract or summarize information under such terms and conditions as agreed between the requester and the public body.

§ 2.2-3704.G. G. Public records maintained by a public body in an electronic data processing system, computer database, or any other structured collection of data shall be made available to a requester at a reasonable cost, not to exceed the actual cost in accordance with subsection F. When electronic or other databases are combined or contain exempt and nonexempt records, the public body may provide access to the exempt records if not otherwise prohibited by law, but shall provide access to the nonexempt records as provided by this chapter.

Public bodies shall produce nonexempt records maintained in an electronic database in any tangible medium identified by the requester, including, where the public body has the capability, the option of posting the records on a website or delivering the records through an electronic mail address provided by the requester, if that medium is used by the public body in the regular course of business. No public body shall be required to produce records from an electronic database in a format not regularly used by the public body. However, the public body shall make reasonable efforts to provide records in any format under such terms and conditions as agreed between the requester and public body, including the payment of reasonable costs. The excision of exempt fields of information from a database or the conversion of data from one available format to another shall not be deemed the creation, preparation or compilation of a new public record.

§ 2.2-3705.2. Exclusions to application of chapter; records relating to public safety.

The following records are excluded from the provisions of this chapter but may be disclosed by the custodian in his discretion, except where such disclosure is prohibited by law:

4. Plans and information to prevent or respond to terrorist activity, the disclosure of which would jeopardize the safety of any person, including (i) critical infrastructure sector or structural components; (ii) vulnerability assessments, operational, procedural, transportation, and tactical planning or training manuals, and staff meeting minutes or other records; and (iii) engineering or architectural records, or records containing information derived from such records, to the extent such records reveal the location or operation of security equipment and systems, elevators, ventilation, fire protection, emergency, electrical, telecommunications or utility equipment and systems of any public building, structure or information storage facility, or telecommunications or utility equipment or systems. The same categories of records of any governmental or nongovernmental person or entity submitted to a public body for the purpose of antiterrorism response planning may be withheld from disclosure if such person or entity in writing (a) invokes the protections of this subdivision, (b) identifies with specificity the records or portions thereof for which protection is sought, and (c) states with reasonable particularity why the protection of such records from public disclosure is necessary to meet the objective of antiterrorism planning or protection. Such statement shall be a public record and shall be disclosed upon request. Nothing in this subdivision shall be construed to prohibit the disclosure of records relating to the structural or environmental soundness of any building, nor shall it prevent the disclosure of

information relating to any building in connection with an inquiry into the performance of that building after it has been subjected to fire, explosion, natural disaster or other catastrophic event.

5. Information that would disclose the security aspects of a system safety program plan adopted pursuant to 49 C.F.R. Part 659 by the Commonwealth's designated Rail Fixed Guideway Systems Safety Oversight agency; and information in the possession of such agency, the release of which would jeopardize the success of an ongoing investigation of a rail accident or other incident threatening railway safety.

6. Engineering and architectural drawings, operational, procedural, tactical planning or training manuals, or staff meeting minutes or other records, the disclosure of which would reveal surveillance techniques, personnel deployments, alarm or security systems or technologies, or operational and transportation plans or protocols, to the extent such disclosure would jeopardize the security of any governmental facility, building or structure or the safety of persons using such facility, building or structure.

7. Security plans and specific assessment components of school safety audits, as provided in § 22.1-279.8. Nothing in this subdivision shall be construed to prohibit the disclosure of records relating to the effectiveness of security plans after (i) any school building or property has been subjected to fire, explosion, natural disaster or other catastrophic event, or (ii) any person on school property has suffered or been threatened with any personal injury.

11. Subscriber data, which for the purposes of this subdivision, means the name, address, telephone number, and any other information identifying a subscriber of a telecommunications carrier, collected by a local governing body in accordance with the Enhanced Public Safety Telephone Services Act (§ 56-484.12 et seq.), and other identifying information of a personal, medical, or financial nature provided to a local governing body in connection with a 911 or E-911 emergency dispatch system or an emergency notification or reverse 911 system, if such records are not otherwise publicly available. Nothing in this subdivision shall prevent the release of subscriber data generated in connection with specific calls to a 911 emergency system, where the requester is seeking to obtain public records about the use of the system in response to a specific crime, emergency or other event as to which a citizen has initiated a 911 call.

[The Virginia Statewide Fire Prevention Code Act](#)

Commonwealth of Virginia, Title 27, Chapter 9 [§ 27-94 et seq]

<http://www.dhcd.virginia.gov/StateBuildingCodesandRegulations/PDFs/2009/Code%20-%20SFPC.pdf>

Virginia Fire Safety Regulations – Virginia Public Building Safety Regulations

http://www.vafire.com/state_fire_marshall/pdf/VirginiaPublicBuilding_Safety_Regulations.pdf

Maintenance Requirements for Existing Buildings

According to Virginia's building and fire codes, an existing building is required to be maintained in accordance with the building code that was in effect at the time the building was constructed and with the requirements of any applicable maintenance provisions of Virginia's fire code. This means that many conditions identified in an older building that may not be in full compliance with today's codes are acceptable because these conditions were okay at the time the building was constructed. As long as the

use of the building is not changed, the building owner is not legally required to retrofit the building to meet the current code.

For example, a room used for spray application of flammable finishes that has been in use since before 1973 is not sprinklered. Because the code that was in effect at the time the building was built did not require a paint spray room to be sprinklered, the condition is allowed to continue even though the currently applicable fire prevention code requires sprinklers in this situation (F1504.6). Yet the room is still required to meet other fire prevention code requirements. For example, the space must be kept free of accumulated residues and solvent soaked rags must be disposed of in metal cans (F1503.4).

Determination of Maintenance Requirements

Many buildings in the State are required by law to be inspected by a fire marshal on an annual basis. In order for the inspection to be performed properly, the inspector should know the applicable codes. While the maintenance requirements are readily available in the current edition of the Virginia Statewide Fire Prevention Code, it is not quite as easy to find the requirements that were in effect at the time the building was built. Only through research of the history of Virginia's building codes can that information be gathered. In attempt to facilitate this research procedure, the printing of the first building code enforced in Virginia is provided.

Henrico County Code, Chapter 11 – Fire Prevention and Protection

<http://www.co.henrico.va.us/pdfs/countyattorney/Chpt011FirePreventionandProtection.pdf>

Health Insurance Portability and Accountability Act of 1996 (HIPAA)

<http://www.hhs.gov/ocr/privacy/hipaa/understanding/summary/privacysummary.pdf>

“Health Care Providers. Every health care provider, regardless of size, who electronically transmits health information in connection with certain transactions, is a covered entity. These transactions include claims, benefit eligibility inquiries, referral authorization requests, or other transactions for which HHS has established standards under the HIPAA Transactions Rule.⁶ Using electronic technology, such as email, does not mean a health care provider is a covered entity; the transmission must be in connection with a standard transaction. The Privacy Rule covers a health care provider whether it electronically transmits these transactions directly or uses a billing service or other third party to do so on its behalf. Health care providers include all “providers of services” (e.g., institutional providers such as hospitals) and “providers of medical or health services” (e.g., non-institutional providers such as physicians, dentists and other practitioners) as defined by Medicare, and any other person or organization that furnishes, bills, or is paid for health care.”

Emergency Planning and Community Right to Know Act (EPCRA)

United States Code, Title 42 – The Public Health and Welfare, Chapter 116 – Emergency Planning and Community Right to Know

<http://www.gpo.gov/fdsys/pkg/USCODE-2011-title42/html/USCODE-2011-title42-chap116.htm>

Key Provisions of the Emergency Planning and Community Right-to-Know Act

Sections 301 to 303. Emergency Planning - Local governments are required to prepare chemical emergency response plans, and to review plans at least annually. State governments are required to oversee and coordinate local planning efforts. Facilities that maintain Extremely Hazardous Substances (EHS) on-site in quantities greater than corresponding threshold planning quantities must cooperate in emergency plan preparation.

Section 304. Emergency Notification - Facilities must immediately report accidental releases of EHS chemicals and "hazardous substances" in quantities greater than corresponding Reportable Quantities (RQs) defined under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to state and local officials. Information about accidental chemical releases must be available to the public. See also Continuous Release Reporting.

Sections 311 and 312. Community Right-to-Know Requirements - Facilities manufacturing, processing, or storing designated hazardous chemicals must make Material Safety Data Sheets (MSDSs) available to state and local officials and local fire departments. MSDSs describe the properties and health effects of these chemicals. Facilities must also report, to state and local officials and local fire departments, inventories of all on-site chemicals for which MSDSs exist. Information about chemical inventories at facilities and MSDSs must be available to the public.

Section 313. Toxics Release Inventory (TRI) - Facilities must complete and submit a toxic chemical release inventory form (Form R) annually. Form R must be submitted for each of the over 600 TRI chemicals that are manufactured or otherwise used above the applicable threshold quantities.

Section 322. Trade Secrets - Facilities are allowed to withhold the specific chemical identity from the reports filed under sections 303, 311, 312 and 313 of EPCRA if the facilities submit a claim with substantiation to EPA.

[Emergency Medical Services Systems Act of 1973 \[Public Law 93-154\]](#)

<http://www.gpo.gov/fdsys/pkg/STATUTE-87/pdf/STATUTE-87-Pg594.pdf>

THE Emergency Medical Service Systems Act of 1973 became Public Law 93-154 on Nov 16, 1973. It promises to have a significant impact on the future practice of medicine. This law adds a section to the Public Health Services Act of 1944 (PL 78-410 - <http://www.law.cornell.edu/uscode/text/42/chapter-6A>), "to provide assistance and encouragement for the development of comprehensive area-wide emergency medical systems." These systems are defined as the arrangement of personnel, facilities, and equipment for effective coordination and delivery in an appropriate geographical area of health care services under emergency conditions by a public or a nonpublic or private entity which has the authority and resources to provide effective administration.

The law demands that a local plan be developed, and it provides monies for feasibility and planning studies, initial establishment of operational systems, expansion of acceptable existing systems, and researches in emergency medical techniques and devices.

[Federal Fire Prevention and Control Act of 1974 \[Public Law 93-498\]](#)

<http://legcounsel.house.gov/Comps/FIREPREV.PDF>

NATIONAL FIRE DATA CENTER

SEC. 9. (a) GENERAL.—The Administrator shall operate, directly or through contracts or grants, an integrated, comprehensive National Fire Data Center for the selection, analysis, publication, and dissemination of information related to the prevention, occurrence, control, and results of fires of all types. The program of such Data Center shall be designed to (1) provide an accurate nationwide analysis of the fire problem, (2) identify major problem areas, (3) assist in setting priorities, (4) determine possible solutions to problems, and (5) monitor the progress of programs to reduce fire losses. To carry out these functions, the Data Center shall gather and analyze—

- (1) information on the frequency, causes, spread, and extinguishment of fires;
- (2) information on the number of injuries and deaths resulting from fires, including the maximum available information on the specific causes and nature of such injuries and deaths, and information on property losses;
- (3) information on the occupational hazards faced by firefighters, including the causes of deaths and injuries arising, directly and indirectly, from firefighting activities;
- (4) information on all types of firefighting activities, including inspection practices;
- (5) technical information related to building construction, fire properties of materials, and similar information;
- (6) information on fire prevention and control laws, systems, methods, techniques, and administrative structures used in foreign nations;
- (7) information on the causes, behavior, and best method of control of other types of fire, including, but not limited to, forest fires, brush fires, fire underground, oil blow-out fires, and waterborne fires; and
- (8) such other information and data as is deemed useful and applicable.

(b) METHODS.—In carrying out the program of the Data Center, the Administrator is authorized to—

- (1) develop standardized data reporting methods;
- (2) encourage and assist Federal, State, local, and other agencies, public and private, in developing and reporting information; and
- (3) make full use of existing data gathering and analysis organizations, both public and private.

(c) DISSEMINATION.—The Administrator shall ensure dissemination to the maximum extent possible of fire data collected and developed by the Data Center, and shall make sure data, information, and analysis available in appropriate form to Federal agencies, State and local governments, private organizations, industry, business, and other interested persons.

(d) NATIONAL FIRE INCIDENT REPORTING SYSTEM UPDATE.—

The Administrator shall update the National Fire Incident Reporting System to ensure that the information in the system is available, and can be updated, through the Internet and in real time.

Appendix C – 2013 Continuous Improvement Strategy

Goal	Objective	Critical Task	Timeframe
Goal 1 To develop a workforce that is prepared to achieve the mission and vision of the Henrico County Division of Fire while exemplifying the core values.			
1A		Enhance the health and wellness of our workforce through programs and processes	12 Months
	Task 1a.1	Develop, deliver and implement a health and wellness program for all department members.	
	Task 1a.2	Develop, deliver and implement a mandatory physical fitness/work performance evaluation program.	
	Task 1a.3	Monitor implemented programs and processes and revise as determined and authorized.	
1B		Enhance the recruitment and retention of the departments workforce through programs and processes	24 Months
	Task 1b.1	Establish a committee to research critical gaps in the recruitment and retention processes.	
	Task 1b.2	Use a workplace satisfaction assessment tool to develop a strategy for employee retention.	
	Task 1b.3	Develop, deliver and implement a comprehensive recruitment program targeting a diverse audience of prospective new employees.	
1C		Design and implement a professional standards program that incorporates internal affairs, customer complaint/feedback review and systems improvement	6 Months
	Task 1c.1	Formalize the process for customer feedback and effectively integrate this into the internal affairs SOG.	
	Task 1c.2	Develop and implement a professional standards database.	
	Task 1c.3	Train the appropriate personnel to effectively deliver the comprehensive professional standards program.	
1D		Enhance the employee development process of the department	12 Months
	Task 1d.1	Update the firefighter Career Development Program.	
	Task 1d.2	Update the officer qualifications program.	
	Task 1d.3	Identify and support professional development opportunities for both sworn and non- sworn employees in achieving career growth and development within Henrico County.	
Goal 2 Enhance the County's overall ability to prepare for, respond to, recover from, and mitigate hazards, emergencies, and disasters.			
2A		Develop and implement enhanced and focused community outreach	24 Months
	Task 2a.1	Leveraging resources in the DOF and other County/HCPs agencies, target seniors, children, and non-English speaking as a primary language to assist in emergency planning efforts.	
	Task 2a.2	Translate existing emergency management materials into languages other than Spanish to target our evolving demographic.	
	Task 2a.3	Establish partnerships with licensed facilities to improve their emergency planning efforts.	
	Task 2a.4	Establish and maintain relationships with business in the County to improve their emergency planning efforts.	
2B		Enhance information sharing and common operating picture awareness both internally and externally	12 Months
	Task 2b.1	Survey stakeholder group and determine what information is needed, including determination of what can be shared (i.e. law-enforcement sensitive information).	
	Task 2b.2	Develop an online tool that is easy to access and includes an overview of important planning information (i.e. road closures, weather info, ongoing maintenance like hydrant flushing or smoke testing) optimized for both internal and external audiences, across a variety of platforms	
	Task 2b.3	Increase the number of active participants in the Code Red emergency alerting system to 10,000 residents and county employees.	

Goal	Objective	Critical Task	Timeframe
2C			24 Months
	Task 2c.1	Develop and implement a corrective action plan process to provide quality assurance and quality improvement opportunities for responses which require emergency operations center activation	
	Task 2c.2	Implement a process to capture and incorporate feedback, lessons learned, and best practices from events or incidents where the EOC is activated at Level 3 and above to enhance the emergency management cycle planning.	
	Task 2c.3	Implement a process to capture and incorporate feedback, lessons learned, and best practices from events or incidents in other localities or external partners to enhance Henrico County's own emergency management cycle planning.	
2D			24 Months
	Task 2d.1	Incorporate after action report details into SOG revisions where appropriate, supporting data for exercise needs and baseline for training course needs.	
	Task 2d.2	Establish a two-year training and exercise cycle for EOC activities	
	Task 2d.3	Deliver at least one focused, position-specific training and exercise cycle for each Emergency Support Function that encompasses key participants from all parts of county government each calendar year.	
	Task 2d.4	Deliver ICS/EOC interface training to all staff that could potentially be assigned to EOC or IMT functions.	
Goal 3 To develop process and data management systems that meet the current and future needs of the Henrico County Division of Fire.			
3A			12 Months
	Task 3a.1	Provide two NIMS 700, two ICS 100, two ICS 200, one ICS 300, and one ICS 400 classroom delivery course each calendar year.	
	Task 3a.2	Support recruit academy course deliveries of NIMS 700, ICS 100, and ICS 200 for Fire, Police, and Sheriff, as requested.	
	Task 3a.3	Improve the use of data to inform Standard of Response Coverage improvements	
3B			18 Months
	Task 3b.1	Conduct a road network travel-time analysis to evaluate both current and future placement of fire stations and apparatus.	
	Task 3b.2	Update published monthly data reports demonstrating compliance with SORC benchmarks and other key performance measures.	
	Task 3b.3	Develop a real-time network coverage projection that will help inform apparatus move-ups during peak demand periods.	
3C			12 Months
	Task 3c.1	Develop enhanced processes for quality assurance and quality improvement by use of technology	
	Task 3c.2	Implement a formal QA/QI program to review 100% of working fire and other major incident documentation to ensure accurate data collection.	
	Task 3c.3	Conduct a needs assessment to evaluate the EMS QA/QI program.	
Goal 4 To develop an optimized community-driven service delivery model.			
4A			12 Months
	Task 4a.1	Complete a comprehensive internal analysis to streamline critical processes	
	Task 4a.2	To enhance to the Standard of Response Coverage through continuous improvement and planning.	
	Task 4a.3	Complete annual updates to the Community Risk Assessment and Standards of Response Coverage.	
	Task 4a.1	Specify the Division's standard for fire department presence in urban/ mixed use developments, as well as other areas and types of future development.	
	Task 4a.2	Evaluate the current special operations program and develop a strategy for improvement, to include roles and responsibilities, requisite training, and equipment load out for each type of company/specialty team.	

Goal	Objective	Critical Task	Timeframe
4B		Develop and implement solutions dealing with frequent consumers of services.	12 Months
	Task 4b.1	Conduct an evaluation/review of current programs that address situations involving frequent consumers of EMS service.	
	Task 4b.2	Implement multi-disciplinary and inter-departmental approach to serving the underlying problems for residents / businesses that are frequent users of the EMS system.	
	Task 4b.3	Develop and implement a tracking system that will detect and alert when there is a frequent consumer of services, enabling focused efforts to be made to evaluate and address the underlying situation.	
4C		Develop improvements for enhanced command and control.	12 Months
	Task 4c.1	Develop a fully functioning Type IV incident management team using Henrico County resources.	
	Task 4c.2	Formalize the deployment process for all special operations, IMT, and EMAC requests.	
	Task 4c.3	Develop and implement a plan for establishing daily "alert levels" based on expected call conditions such as red flag warnings, drought conditions, predicted storm activity, etc.	
4D		Formalize a research and development doctrine for the Division of Fire.	18 Months
	Task 4d.1	Create a working group to evaluate new practices and technology related to the delivery of services.	
	Task 4d.2	Institute a procedure to review and disseminate lessons learned and best practices from internal and external incidents.	
	Task 4d.3	Develop an effective mechanism for sharing improved tactics, techniques, procedures, and equipment across the Division of Fire.	
Goal 5 Develop an effective and comprehensive training and certification program.			
5A		Develop and implement an online training delivery and documentation system.	12 Months
	Task 5a.1	Implement on-line training initiative that includes access to an instructional library of validated courses, allows for the uploading of customized video classes, and testing.	
	Task 5a.2	Ensure I.S.O. compliant training records storage.	
	Task 5a.3	Develop and deliver a training program to orient all personnel to the new online training system.	
5B		Develop and implement processes for enhanced officer development.	18 Months
	Task 5b.1	Implement officer development training programs for prospective lieutenants and captains.	
	Task 5b.2	Provide officer in-service classes at least annually.	
	Task 5b.3	Conduct bi-annual realistic command competencies lab / testing for all command officers (Captains and above).	
5C		Develop and implement an enhanced special service / special operations training program.	18 Months
	Task 5c.1	Deliver a truck school (specifically to include extrication, rope rescue, and aerial operator training).	
	Task 5c.2	Deliver a rescue or squad company school (specifically to include advanced RIC, extrication, rope rescue, and hazardous materials).	
	Task 5c.3	Ensure all specialty teams have adequate number of appropriately trained members on each shift and location.	
	Task 5c.4	Implement a Hostile Situations Training Program with Henrico Police.	
5D		Develop and implement a system to ensure annual basic competency training.	12 Months
	5d.1	Conduct annual live-fire training for all members.	
	5d.2	Conduct an annual hazmat operations refresher for all members.	
	5d.3	Conduct an annual firefighter survival skills refresher.	

Goal	Objective	Critical Task	Timeframe
Goal 6 Utilize technology efficiently and effectively within the Division of Fire to meet current and future needs.			
6A		Improve integration of technology and business practices.	24 Months
	6a.1	Implement electronic tablets as an alternative to the use of a mobile data computer in certain applications.	
	6a.2	Implement an enhanced records management system for all administrative records and files.	
	6a.3	Develop a tracking solution that will both document progress and facilitate successful outcomes.	
6B		Improve data connectivity at critical facilities.	24 Months
	6b.1	Install transient local area network internet service, or acceptable equivalent, at all fire stations to support training, communications, station alerting, etc.	
	6b.2	Install station alerting programs in all fire stations.	
	6b.3	Enhance wireless connectivity at all fire stations and support facilities.	
6C		Improve planning efforts to ensure that the technology budget, implementation, and support program meet the needs of the Division.	12 Months
	6c.1	Create a technology focus group that can help identify areas for improvement and help implement user-focused solutions.	
	6c.2	Develop a comprehensive plan that outlines the standard technology package for each station, support team and all staff officers.	
	6c.3	Develop a five-year plan, working with County IT, which will be used to guide the Division of Fire's technology program.	
Goal 7 Develop a comprehensive community risk reduction model.			
7A		Develop and implement a system to ensure greater focused community outreach.	24 Months
	7a.1	Research and implement an injury and illness prevention program for target-risk groups.	
	7a.2	Establish an ongoing smoke detector awareness and installation program in geospatially identified at-risk neighborhoods.	
	7a.3	Develop and distribute a household safety calendar targeted at senior citizens.	
	7a.4	Fire Marshal's Office to partner with 6 station captains each year to develop CRR programs specific to those station's communities.	
7B		Develop and implement a system to ensure greater marketing and communication.	12 Months
	7b.1	Redesign and rollout the Division of Fire webpage. Aggressively pursue additional social media opportunities (Facebook, Twitter, etc) as a way of reaching out to the community.	
	7b.2	Strengthen the ability to communicate emergency and non-emergency information to the community through the marketing of the Code Red text alerting system.	
	7b.3	Develop a quarterly e-newsletter addressing risk reduction topics and distribute to the community.	
7C		Develop and implement an enhanced pre-planning system.	12 Months
	7c.1	Evaluate and select an electronic preplanning solution that will meet the needs of the Division.	
	7c.2	Providing training to Division members on the use of the new preplanning system.	
	7c.3	Develop a process to ensure review, standardization, and final approval for all preplans.	