

Field Engagement Paper

CMAT 465

Fire Department Group

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Our organization of the fire house needed to know on how to advance their technology within their department in Salisbury. Most of the technology provided to the firehouse is county funded so it was kind of difficult to come up with solutions for them to make right away after our recommendations. With county funding being the main source of capital our group is going to give a recommendation to give to the county and the department on what we think would be the best possible outcome. The personal significance of this project was to see how different individuals had different opinions and conflicts with the technology they use on a day-to-day basis. The social significance of this project was for our group to learn and comprehend the technology the fire department uses to ensure safety in our area. This is useful because then the members in our group know the inner workings of the fire department to give them the best recommendations we can give them. We also had the privilege of interviewing volunteers and career firemen. This gave us a double point of view of how the technology was running by two different types of employees. One of our main key findings within this project was how the fire department was trying to configure over to a secure cloud system. This is very important to them because most of the information taken by the firehouse is extremely confidential and should never be shared with any civilian for personal use. With this being said our main focus with this project was to research and find a secure network for the county to provide to the Salisbury fire department. This then ties up with our main research goal was to find the firehouse a more secure network to run day-to-day operations more efficiently and effectively.

<u>Type of Technology:</u>	<u>Role Designations:</u>
Radio System	Every member of the firehouse has a radio to wear around the fire house and in the field to communicate with each other and the call center.
GPS System	GPS is used in the firehouse and on the vehicle's computers that are used for their operations.
Two-Way Computer	This system connects the fire department with the central dispatch system.
Windows Computer	Windows is the basic computer model used throughout the Salisbury fire department.
Alarm System	This system has 2 buttons that the firemen can push to trigger a call that goes throughout the fire department via two different types of loud alarms.

Within the organization some processes that they use are the inter organizational schedule network. With this network the firemen can download the fire chief application to view news within the department and to view when they are up to work. This application would be an inter

and intra network. It is an inter network because all of the information is put up by member of the department. This is also an intra source because the application is ran by an external company than is provided to the department for their needs. One of the main policies our group observed with this application is the policy that only the chief and assistant fire chiefs can post information to firehouse reading purposes. This is a very important policy noted by asst. Chief Donaway because only the chiefs have the rights to tell the firemen the information that is important to them without any junk other members may feel like posting.

Going into theories, our group thought the Complexity Theories and ICT's was the most relatable to the fire house due to the communication side and keeping everything up-to-date. Artificial systems such as computing systems are characterized to have complex behaviors and have become known as Complex Adaptive Systems (CAS).

“CAS are dynamic systems able to adapt in and evolve with a changing environment,” says Serena Chan who wrote Complex Adaptive Systems. For the fire department, they have a data saving system called FIREHOUSE software, but they need more up-to-date software that is more efficient (eg. cloud systems). On the class slides, Professor Argwall said that ICT's (Information and Communication Technologies) influence communication between parties. In the fire department's case, their communication with each other and the 9-1-1 call center is crucial. If they are not communicating, something could go wrong, where the responders go to the wrong location and delay their responding time; or the firefighters/EMTs could enter in the wrong information or diagnosis and the patient could have something more serious than they entered into the computer's system. So the communication between all of the volunteers and paid firefighters/EMTs at the fire department, the 9-1-1 call center and even the hospitals involved (to

let them know what are the injuries and what is happening with the patient) is very serious and should not be taken lightly.

The complexity Theory and ICT's definitely helped our group guide us to what we needed to observe and what questions we needed to ask during the interview process. We knew that we had to look at what kind of servers and hardware they had to see what we were working with. But also make sure to ask how they (the fire fighters, EMTs, Chiefs and Assistant Chief) stayed connected with each other and the 9-1-1 call center. Whether it be via radio, phone, texting or the portable computers they were using.

During the course of our time at the Salisbury Fire Station, we collectively notice a range of technological applications that are used to make the jobs of the EMT's, firefighters, and volunteers more effective. To help understand the use of these technologies, we took a census of the most important ones, observed them through predetermined time intervals, and came up with three overarching themes from cloud systems, security systems, and county funding. To help apprehend further why these three themes are important, the analysis of the apparatus must be done.

The Salisbury Fire Station is a very complex organizations where technology is the key medium to run the station. Major technological apparatuses seen throughout the organization are radio system, Mobile Data Terminals (MDT), computers, GPS system, and the alarm system.

The radio system is one of the essential technologies used throughout the organization, according to volunteer firefighter Kelly Stottlemeyer, they uses the radio systems to talk to each other with different channels based on the call, if someone is on fire, EMS or an incident where

they need to switch to a channel, it is essential that the waves are not being interrupted by other Fire and EMS calls.

MDT: mobile data terminal, show where all the calls are coming from, and if it's a fire, on call, or on service. When the dispatcher calls in shows us where one going, who is going, and other things firefighters need for their reports. Reports are done on an online system, which is why computers are a key use in the organization. The use of computers are seen throughout the fire station and even in the vehicles they use, there are different types of computerized systems and applications used from the fax machine to MDT's..

Within the different rooms of the station, there are computer monitor and GPS system, this is beneficial to them because, if a call is incoming the person on duty can see an arrow where the area of the call is, and a map of the city in general. One can also see different calls from the police station to other apparatus. The use of pagers is also important because if a volunteer or firefighter is at home and the pager goes off, it will alert the person that they are needed. The alarm system is also a key apparatus, where these are about two specific tones to help alert what type of emergency is occurring and lets them know if EMT's are on duty or fire fighters.

It is seen that although the apparatus is complex a cloud system is lacking, and through our observations we saw how a cloud system would help innovate the work of the firefighters. A cloud system is a cloud "infrastructure" from Hewlett-Packard, which helps combine content, storage, servers, and other software. This would help save important documents, efficiently access documents on different apparatuses, and help everyone in the organization connect and access documents from home or on the job.

Security is also seen as something that is lacking. A security system in this context can be seen as a firewall computing system, of hardware and software that limits the exposure of

outside networks from attacking another system. According to Assistant Chief Donoway, if different and new technologies such as the cloud were to be installed a firewall would be a major concern. This is an important thing to keep in mind, because it can restrict the innovation and the improvement within the technological apparatus at the organization.

The last theme that is presented throughout these observations is the financial obstacles the stations face. It is seen that even though the station would like to improve technologies funding is an issue. A lot of the apparatus that are used in the station range from 500- 3,000 dollars and can even exceed more. The issue with getting new technologies is seen through state and county funding, which has to be approved by state and local governments.

Throughout our observational portion of our field engagement, we saw an abundance of innovative technologies, and we saw an opportunity to take what the station had to offer and improve the efficiency of the organization by adding a cloud system, a firewall, and help with county funding.

There are several themes that were pulled from our observations while at the Salisbury Firehouse. While at the firehouse, my group observed the themes that were obvious in relation to technology. The first theme was incorporation of a cloud system. The second theme was installing a security system also known as a firewall for their computer system. The third noted theme was the need for funding so the fire house can stay equipped with the new technology. For this half of the paper, will analyze the themes and relate them to the themes learned in class.

First I will analyze the first theme, incorporating a cloud based system in the fire house why would this be important? Well, with technology advancing rapidly and paper work becoming a thing in the past the fire house will eventually need a place to store their files and with a cloud system the many files they do have will always be available to them. Connecting the

theme of incorporating a cloud based system to a media richness theory. The media richness theory is a theory that frameworks how successful a medium is as well as how helpful it is. A cloud based system would be useful for obvious reason. The first reason being that their data and important documents will be stored safely and remain undisrupted until someone needs that data or document. This cloud system would be a secure system that allows firehouse employees to access data from a secure place giving them security knowing your data is in a safe place.

The second, theme was installing a security system with a firewall strong enough to keep their computers and data safe. The firehouse needs a secure security system so their data cannot be compromised. According, to the Assistant chief on duty, the firehouse has sensitive paperwork and confidential files that should not be accessed by anyone without permission. Connecting the security systems to the media richness theory and the complexity theory. The complexity theory relates to a secure system because human interaction in the fire house in a fire house is complex due to technological applications. The complexity theory, communications throughout other city organizations. Connecting the theme to the media richness theory, this will make their confidential computer information secure so they cannot be hacked or have the data that they deem important.

The third, theme observed theme was the need for more funding from the country so the firehouse can always be equipped with new technology. Although, from appearance the firehouse may appear up to date with their technology but there is always new technology that could better the fire house and make communication between them easier. This final theme, receiving more money for new technology relates to the media richness theory. If they receive more funding they will be able to have the state of the art technologies. According to an office



employee, “the computers are often slow because there is so much information on them”. New technology would keep things like this from taking place.

While, on site we noticed that there was not, a cloud system to save their data. From there we came up with our research goal. Our research goal was to to show the Salisbury fire department a secure system that will be more efficient than their current data saving system now. We also notice, that there isn't a clear way the fire station can adequately communicate with the community through present day technological outlets. All technology is not new technology and advancements are being made rapidly in relation to technology. With that being said, I will explore why the goal we have will be the best alternative for the fire house. Focusing on our goal it is the best alternative compared to any other technology out there. Other ways to store data would be the old way paper, or saved up on one big hard drive. The cloud system trumps both options because it is easy, effective and will last a lifetime.

If the firehouse was to incorporate a cloud based system, it would be more helpful than harmful. Little to no training is required to save your data on a cloud system it's literally a click of a button similar to someone saving a document on a desktop computer. If the fire house does not update to a cloud system, they will eventually have an issue three to seven years down the road ultimately creating a barrier between user and the technology. An example that a cloud system would be useful can be seen in the development of the newest firehouse. They have to move old paperwork to the new office but if they had a cloud system this would not be something they would have to worry about because all their computer data is saved in the cloud.

In conclusion, The Salisbury fire department has a stable environment and have great ICT's in place in order for them to remain in constant communication. Although, communication may appear complex the technologies they have in place are efficient for the time being but in

the long run the themes and suggestion behind our research support our goal, for the Salisbury fire department to incorporate a cloud system.

The Assistant Chief that our group interviewed during the interviewing process brought up the issue of the security aspect of the cloud systems. He first said that the way the fire department communicates with the 9-1-1 call center is by them sending notes over their computer system, which he felt was better than them blasting that same information over the radio stations. The general public has access to the radio scanners and is allowed to listen to the 9-1-1 scanners. The Assistant Chief went on to say that the fire department nor the call center is trying to hide anything from the general public at all. But when the people on duty start to talk about the patient's personal information, they begin to worry about HIPAA (Health Insurance Portability and Accountability Act of 1996).

The fire department has a duty Chief that communicates with the people that run their systems for them. They also have an incident reporting system (FIREHOUSE Software), that is used to manage their records and data. It collects calls that come from the 9-1-1 center, keeps their training records, health and safety records and activities they perform (E.g. fire prevention or public education). The fire chief said that they were trying to get out of base server and get into a cloud system.

“We are having problems with their software and our firewall... If the city does not have a good firewall, then were going to be jammed up with cyber-attacks.” Said the Assistant Chief

Going back to our groups main goal, we wanted to show the fire department a secure cloud system that would be more efficient than their data saving systems now. Some recommendations our group has come up with are XMRFire (Emergency Service Consulting) and MSDSONline's Plan1.

The XMRFire, which is associated with Google and Google Apps, assists with websites and cloud services. The cloud services include “file storage, online hydrant databases, forms, video and multimedia service, online exams and certification for the public and employees, and custom solutions to meet your department's individual needs,” which is stated on the XMRFire website. It also talks about secured data, saying “Your data is secured with our up to date software, round-the-clock website maintenance, and state-of-the-art US based data centers.”

Our other recommendation to the fire department is MSDSONline, which is the leading cloud-based provider that manages global hazard communication (HazCom) regulatory compliance requirements. New to the MSDSONline program is Plan1. Plan1 is “a cloud-based chemical information sharing service that allows MSDSONline HQ and HQ RegXR customers to share critical hazardous product information, including inventory lists, floor plans, MSDSs, and more with you, their first responder community.”

How it works is if a business has chemicals within their facility, the fire department asks them if they are MSDSONline customers, if they are, the fire department sets up the Plan1 connection, free of charge.

Plan1 provides first responders access to critical chemical information and company-specific chemical information anytime and anywhere they have access to the internet. Though this program is only useful for chemical related problems, this would benefit the Salisbury Fire Department. They would be allowed access to any company in their region, with chemicals on site, their emergency exit plan, chemical container maps and chemical inventory lists. The program would also benefit with the communication between companies and the Salisbury Fire Department and keep the city of Salisbury safe.

This class helped our group develop communication techniques that we used while we were working in our organization. First, our weekly readings helped our group use real life examples to use while comparing technology when talking with our liaison with the fire department. For example, in week ten we had to read the wireless policy which was the best practices and guidelines for location based services. This compared to our findings because the department uses all location based services on the equipment they use on a regular day's operation. Next, our daily readings and discussions helped our group on learning how to be a technology consultant. With the discussion part of the class this helped our members of our group learn how to communicate between people. This was a key factor because many people in our class had different opposing viewpoints that we had to discuss with and understand where they are coming from with their information. The class lectures gave us useful information about the policies and regulations concerning the different types of technology. For example, our group took many notes while discussing the different cloud based systems. We then used this information to talk to the chiefs of the firehouse with the different options that are available in the marketplace for their use. Lastly, having a real life instructor helped out as opposed to an online class. Having a real life instructor helps backbone on how our group was to communicate with someone of authority to show them respect and to be professional as well.

The first thing our group learned based on the theoretical intersections of this project was knowing which theories related to our project. Complexity theory was our main focus because this theory looked at the concept of the cloud and how complex the cloud really is. We learned the pragmatics of this project by dealing with the types of technology in a real life and practical matter. While being toured around the firehouse our group actually got to go inside all the vehicles and the compartments each vehicle had to get a better understanding of what we were

working with. Our group learned the regulatory measures of the fire department by interviewing several different types of firemen while in the interview process. While talking to the volunteers of the department they told our group the different regulations they have to undergo that differ from the career firemen. Such as, with the volunteers they have to work and be at the firehouse for a minimum of 40 hours per week. Also, volunteers either had to be a full time student or be employed in a company working an average of 30 hours per week to be eligible to be a volunteer fireman. The social factor our group learned was the hard work and schedules the firemen had to protect and serve our local community. For example, Assistant Chief Donaway told us his weekly schedule is to work 4 days straight in a row, twenty-four hours in a row then three days off following the four straight work days. We learned about the different cultural factors of the fire department by examining the different people that work in the department. The Salisbury Fire Department has a very diverse staff of all ages and ethnicities. Finally, the personal interactions within the department were fantastic. Every single member of the department that we talked or interviewed with were very happy to share information about their technology to help our group analyze the best possible outcome to share with them.

## Observation Themes

### Firehouse Group

1. New state of the art technology inside all the fire departments vehicles.
2. High security already in place in trying to safeguard the departments servers which are located in a computer room in the firehouse.
3. Workplace safety with equipment is very important to the department to follow to ensure safety within their members.

## Barriers from interviews

### Fire Department

Goal : During the time at the fire station, we noticed that there was not, a cloud system to save their data. We want to show them a secure system that will be more efficient than their data saving system now. We also notice, that there isn't a clear way the fire station can adequately communicate with the community through present day technological outlets such as social media: Facebook, Twitter, Tumblr, Wordpress, etc. We would like to see how they can incorporate these technological outlets to better their connection to the Salisbury community and how it can improve the work that they do at the fire station.

Themes throughout our data sources:

- County funded
- Cloud Systems
- Security

Michael McLean

In-Depth Observation Table

Framework Bullets	Technology/User Role	Observation—Needs, Barriers, Facilitators, Training etc.
<i>Theoretical Features</i> Rogers Diffusion of Innovation	Reliability Trialability Observability Late Majority Early Majority	• Freeze in the office • Chrome over internet explorer
Garbage Can Model	People (Choices): No Accidents on Twitter yet	• Lots of downtime, could be well for new technology training • mid-computer life cycle
Media Richness	Asst. Chief	• Different computer systems throughout the house
Impression Management	Asst. Chief	
<i>Technological Features</i> Hardware features:	-Tells what reports were completed Twitter says some calls Antenna Satellite	Small antenna wires Ambos can make a mobile hotspot
Software features	Data entry system	Calls broken up by turn, dept, what kind of call
Usability	Design features on IIR website	Times in Chrome order - where button to go what's going on

\* spread IT goods  
 \* driver's board  
 \* fast engines  
 \* roller on mass can  
 mess up hospital calls  
 \* fix and create software  
 \* more in fire, ambulance, hazmat  
 \* pass long book still written out  
 Fire Suppr slow



**In-Depth Observation Table**

<b>Framework Bullets</b>	<b>Technology/User Role</b>	<b>Observation—Needs, Barriers, Facilitators, Training etc.</b>
<i>Theoretical Features</i>		
Rogers Diffusion of Innovation	Reliability Late Majority Early Majority	Reliability – The department as a whole is reliable the city and county of Salisbury Managers and employees rely on one another in case of emergency as well as day-to-day jobs. Late Majority – one of the last counties to connect to Maryland EMT system Early Majority – Generators keep power on if power failure
Garbage Can Model	People Choices	Garbage can model is used everyday when working along side people everyday like those in the SU fire department Firehouse dinner – group decision about dinner About who goes on what call
Media Richness	Computers IPhones People	Each chief is given a cell phone as well as a duty phone There are computers all over the fire house and a special office area where employees typically gather and do online research Barriers – computer training optional Not everyone has access to iPhone
Impression Management	People – Employers and customers	Observation – Overall good impression management’s skills amongst employees. Dress code Barriers – Not everyone remembers the training when dealing with people
<i>Technological Features</i>		
Hardware features	Antenna	On cars and trucks typically to improve connection between cars as well as radio
	Satellite	Satellite computer systems connecting all computers between EMS/FD/PD
Software features		