Emergency 911 Response

Understanding the Problem

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Abstract

This document describes the results of the first design steps of our project: a system for dispatch centers that takes advantage of the multimedia capabilities of modern smart-phones to enable a comprehensive understanding of emergency situations by making more meaningful contextual information available and to enable dispatchers to communicate to involved parties via non-traditional media. The design process, starting with a raw project definition, relies on requirement gathering through interviews and observation to define several types of users for our system.

Table of Contents

- Emergency 911 Response
  - Abstract
  - 1. Introduction
  - 2. Current UI Critique
    - 2.1 Strengths
      - 2.1.1 Interoperability and connectivity
      - 2.1.2 Data scalability
      - 2.1.3 Familiarity
    - 2.2 Weaknesses
      - 2.2.1 Systems integration
      - 2.2.2 Event mapping and unit location awareness
      - 2.2.3 Unfriendly user interface design
      - 2.2.4 Outdated systems and support
  - 3. Information Gathering
    - 3.1 Requirement Gathering Methods
      - 3.1.1 Interview summary
      - 3.1.2 Observation summary
    - 3.2 Results
      - 3.2.1 Interview results
        - 3.2.1.1 Interview on 02/01/12 with Walter Warner (GTPD Communications Director)
        - 3.2.1.2 Interview on 02/01/12 with GTPD's Steve Travis (IT Specialist)
        - 3.2.1.3 Interview on 02/03/12 with GTRI's Jay Sexton (Senior Researcher)
      - 3.2.2 Observation results
  - 4. User Characteristics
    - 4.1 Summary
    - 4.2 Personas
    - 4.3 User Characteristic Tables
      - 4.3.1 Persona User Characteristics
        Persona
      - 4.3.2 General User Characteristics
        Persona Represented
  - 5. Constraints
    - 5.1 Constraints on Design
    - 5.2 Constraints on Design Process
  - 6. Implications
  - 7. Functional Requirements Summary
  - 8. Functional Requirements and Task Analysis
    - 8.1. Knowledge, Skills and Abilities (KSA's)
    - 8.2 Object Model of Proposed System
    - 8.3 Distributed Cognition Model of Proposed System
    - 8.4 Existing Dispatcher Environment
  - 9. Critical Use Cases

10. Usability Goals
11. Reflections
12. Appendix
    12.1 Questions for interview with GTPD's Walter Warner (Communications Director)
    12.2 Questions for interview with GTPD's Steve Travis (IT Specialist) and GTRI's Jay Sexton (Senior Researcher)
    12.3 Responses for 02/01/12 interview with GTPD's Walter Warner (Communications Director) and Steve Travis (IT Specialist)
    12.4 Responses for 02/03/12 interview with GTRI's Jay Sexton (Senior Researcher)
    12.5 Notes from 02/01/12 short 5-minute informal observation of dispatch center
    12.6 Notes from 02/09/12 two-hour observation of dispatch center
    12.7 Emergency Experience Survey
    12.8 Some elements of existing CAD systems

1. Introduction

The operation of today's public safety dispatch and communication centers is dependent upon information and the ability to manage and share it. Dispatchers and public safety officers depend heavily upon computer-aided dispatch (CAD) software. The design, development, installation and support of CAD systems is tasked to enterprise software companies specializing in these types of systems.

Often times, the approach taken by software companies is a one-size-fits-all approach for their systems requirements. However, the reality is that the needs of smaller public agencies vary widely compared to most medium-large public agencies. The Georgia Tech Police Department (GTPD) is responsible for providing a safe and secure environment for the Georgia Tech community, and operates out of a small dispatch center tasked with one to two dispatch officers. The GTPD dispatch center works closely with Atlanta Police Department (APD) and other campus-city-state-federal agencies.

The maintenance, customizability, and technical support of the CAD system can also be a complicated endeavor for any public safety agency. It involves not only the installation of computers and the CAD software, but usually connections to a wide variety of other systems: alarm inputs, mobile data systems, time synchronization sources, records management systems, CAD systems of other agencies, and the local, county, state and federal network of criminal justice databases.

Our system is not intended to replace GTPD’s current CAD system. Instead, it aims to fill the gap of various features that are currently unavailable with a user interface that is accessible and functional for the dispatchers. The main features supported by our system will be:

1. A Georgia Tech campus map to display a summative representation of the location and status of on-going open calls, incoming multimedia, open incidents, and on-duty officers.

2. The capability to display media (text, photos, videos) and associate it to a particular caller, incident, or location.

3. A means to enhance existing communication with all parties (emergency source, emergency responders, third parties, etc.) by easily sharing contextual information and media.

2. Current UI Critique

2.1 Strengths

2.1.1 Interoperability and connectivity

The CAD computer and software is linked to other computer systems, including the agency's E911 system (to automatically fill in the caller's name, address and telephone number), local-county-state-federal law enforcement databases (National Crime Information Center reports, warrants, vehicle registration, driver's license, stolen vehicle and property, etc.), master clock synchronization, radio systems (to show last unit that broadcast), mobile data, records management of all voice traffic, and paging systems. The system allows the dispatcher to query these records database via the CAD system and data is returned directly in the CAD interface. Our system will link with incoming CAD calls-for-service to augment contextual information and media related to each call if available. Our system would also allow for the dispatcher to quickly share information and media with the emergency caller and officers in the field.

2.1.2 Data scalability

The Georgia Tech Police Department's current CAD system is supported by the Georgia Tech Office of Information Technology. All calls and radio communication exchanged between the dispatch center and the external world (officers in the field, emergency callers, and other agencies) are recorded and stored indefinitely. The CAD system and radio systems are supported by a robust network infrastructure and back-end database to support the volume of incoming calls. As of February 9, 2012, there had been over 14,000 calls for service entered for the 2012 calendar year. Our system will connect with the existing SQL database containing all CFS calls to augment the stored information available of each call with additional media and context.

2.1.3 Familiarity

The GTPD dispatch environment is highly chaotic and dispatchers are expected to multitask while answering phone calls, attend to the dispatch window, open the GTPD front door, enter information into the CAD system, and monitor notices and alarms from multiple systems. Dispatchers understand the CAD system and have devised ways of finding workarounds to several of the user interface failings. They are also familiar with most shortcuts and the most frequently used input forms. There are a number of CAD systems available on the marketplace, and the current CAD is one of the most common systems used. If a dispatcher would transfer from another dispatch center, they would be familiar with most functions available in the interface.

2.2 Weaknesses

2.2.1 Systems integration

Even though the current CAD system is able to connect with external databases directly from its interface, it is not easily integrated with other systems (campus video feeds, weather alerts, RAVE Jacket Guardian system, siren warnings, message board, etc.) being used in the dispatch center. There are currently 10 individual PC monitors, 3 flat screen televisions, and other hardware devices for the alarm and phone systems. Our system will integrate with the current CAD system and database to extract information about the relevant calls-for-services and augment the information available to the dispatcher. The integration of our system with all other systems in the dispatch center is beyond the scope of this project.

2.2.2 Event mapping and unit location awareness

Incident locations are entered from 911 or manually typed in by the dispatchers. The CAD software matches it against a geofile created by the department when the software was first installed. The geofile is a database of standardized locations, including specific house numbers and streets names, commonplace names (Tenth Street), and intersections. The geofile ensures that locations are within the jurisdiction, within a valid block number range, and are consistently entered and entered (which assists in later searches). However, by expecting the dispatcher to manually enter approximate locations, the system is left open to human error.

CAD has a database of personnel and field units, which is used to display a list of cleared (off-duty) units and units on active duty. This database includes the unit ID, assigned personnel, and special capabilities (K-9, SWAT, etc.). The database is linked to the incident database, allowing the dispatcher to display unit status: in-service and out-of-service. Officers are also expected to report their status at least every 30 minutes. The dispatcher can change a unit's status or assign them to particular incidents.

The current system is able to associate units with a particular open call and location given by manually assigning them to a call-for-service (CFS) number item. The current system does not provide functionality to visually map the location of each unit and active calls. Using our system, dispatchers will be able to monitor an officers' whereabouts on campus and display their location in real-time. This feature will facilitate assigning on-duty officers to incoming calls by their nearest location to respond to an emergency faster.

2.2.3 Unfriendly user interface design

The current CAD user interface is familiar to the dispatchers, but the system and environment is not designed to be user-friendly. Performing the most commonly used operations requires multiple clicks and right-clicks. Pop-up windows are also used in the system to allow the dispatcher to enter new call-for-services and perform queries. However, the system does not allow the dispatcher to easily switch between screens by locking the active on-screen window and releasing it until any given operation is performed in that window.
Our system interface needs to be easy to operate and easy to learn using simple drag/drop functionality. The interface should be customizable and will allow for multi-touch interaction, as well as keyboard and mouse operation. Dispatchers do not receive extensive training before

beginning work at the dispatch center. They receive one week worth of orientation and are expected to learn most systems by on-the-job training. In addition, our system will seek to prevent duplicate data entry by the dispatcher. Finally, report generation helps the dispatcher analyze incident and unit activity, and CAD allows production of reports listing all types of information, by ranges of date and time, and sorted by various fields. Generating these reports requires multiple unnecessary right-click/clicks to select the open case, generate the report, and print the report.

2.2.4 Outdated systems and support

The software and hardware systems powering most public safety agencies in the United States operate 2-3 generations behind. Systems are expected be highly robust and “just work.” Today, technology is moving faster than ever and public safety agencies are not keeping up with software and security updates. The current CAD system does not support receiving text messages, pictures and videos. In addition, the system has not been updated in over five years. The software provider does not provide active technical support and maintenance of the system and the network infrastructure is tasked to the GTPD IT manager. Our system will be developed using modern technologies, hardware, and interaction paradigms.

3. Information Gathering

3.1 Requirement Gathering Methods

Our information gathering methods were of two forms: interviews and observation.

3.1.1 Interview summary

We knew that we wanted to interview dispatchers themselves, a dispatch supervisor, and someone knowledgeable with dispatch-related information-technology support. We called Georgia Tech Police Department and asked if there was someone who was in charge of IT for the department. They connected us to Steve Travis, who both agreed to meet with us and suggested that Walter Warner, the Communications Supervisor, join us as well. Stuart, one of our team members and an employee of GTRI, also knew of a researcher there, Jay Sexton, who had done work with public safety IT. We emailed him and he was happy to meet with us. We initially planned to run a survey of potential users regarding their experiences with calling 911. We generated questions to ask for each of the three different types of participants: public safety IT, dispatch supervisor, and 911 caller. During the interviews (first with Mr. Travis and Mr. Warner on 02/01/12 and then with Mr. Sexton on 02/03/12), our entire group went through all of the questions and then continued with follow-up questions regarding cases we had not anticipated. We did not record either of the interviews, rather members of the team took detailed notes throughout the interviews.

3.1.2 Observation summary

After the interview with Walter Warner and Steve Travis, we were allowed access into the communications center (where the dispatchers are based) and showed us around. After conducting both interviews at GTPD and GTRI, we realized that the results from our survey would be extremely limited in value. We decided that we gained more from our five minutes in the communications center than a whole lot of responses of “I have never been in an emergency situation.” Thus, we emailed Mr. Warner and asked if we could come back and observe the communications center for a few hours. He agreed and Gabriel and Chad spent just over two hours on 02/09/12 observing the center and casually interviewing the two on-duty dispatchers (Dawayne and Alisha) and Mr. Warner, who was working in the center that day submitting a warrant. Detailed notes were taken throughout by both Gabriel and Chad, though they did not make any recordings.

3.2 Results

3.2.1 Interview results

Please refer to Section 12 (Appendix) to see all interview questions asked. Here are the most relevant notes and highlights of the interviews conducted.

3.2.1.1 Interview on 02/01/12 with Walter Warner (GTPD Communications Director)

Standard Call

- Campus phone 911 (<50%)
    - call comes to GTPD, includes location info down to room number
- Cell phone 911 (>50%)
    - ATLPD → GTPD along with any info ATLPD has gathered, ATL stays on the line
- Smart911
    - RAVE911 info comes to GTPD
    - ATL has their version
    - Profile info for anyone signed up for the system
    - Panic feature
- ATL can ping cell towers, GTPD cannot
- Questions:
    - What is the emergency?
    - What does the perp look like?
    - Are there any weapons?
- GT: Dispatchers handle all aspects of the call
- ATL: One person answers phone and transfers
- Dispatcher cannot look up the number of the caller
    - Backend-generated reports can see the number

Any type of realtime information would be helpful

- Currently all you can do is call
- No environmental knowledge currently
    - *but would definitely be useful*
- Some systems do support MMS
- RAVE companion only supports SMS
- Ideally dispatcher would be able to send information to the officer

Opinions, likes and dislikes about the CAD system

- Problems with current CAD system:
    - No real problem besides lack of updates and support
    - Thus, looking to replace it
- Key feature:
    - Being able to pull up officers' activities sequentially
- Wasted features:
    - "utilized up to its capability"
    - no real "bells and whistles"

- Features requested:
    - Mapping feature
        - Real-time
        - seeing officers' locations
        - sharing info would be really helpful

3.2.1.2 Interview on 02/01/12 with GTPD's Steve Travis (IT Specialist)

Computer Assisted Dispatch (CAD)

- Mouse+Keyboard
- Pop-up boxes based on signal code to make sure the correct questions are asked
- Mapping feature is currently down
- SQL Backend on Windows Server
    - "Storage is cheap."
    - *Everything* is recorded
    - Nothing is purged
    - Administrators can access full history
    - Dispatchers can access last 45 minutes
    - Integration-wise: pulling yes, pushing no

3.2.1.3 Interview on 02/03/12 with GTRI's Jay Sexton (Senior Researcher)

History of 911

- 911: auto-connects to public safety
- Enhanced911 (E911): connect and location (worked well for landlines)
- TTY machines for the deaf (no one uses them anymore, they text)
- E911-2: Cellphone providers provide location w/in X ft w/in Y minutes
- VOIP-911: Third-party handles 911 location
- NG911: What can we do now?

Public safety is often 2-3 generations back

- less of a problem when tech moved slower

Dispatch Centers

- decent-sized ones: 24 people
- 3 cases for callers: always know where they stand
    - person
    - hold message
    - busy signal
- How do you ensure continuity of communication with non-voice options?
    - Providers do not currently guarantee texts
- Dispatchers need to know how the information is getting to them (call, voip, data, sms) in order to reply appropriately
- Dispatcher must receive media, vet it, and then forward it
    - All of these processes must be standardized

Dangers to avoid of NG911

- prevent texts from getting lost in the shuffle
- communicate info to field officers
- currently 1 dispatcher to 1 caller (1:1)
- future is 1 dispatcher to 1 caller and all of their information (1:1+*multitasking*)
- CDMA vs. GSM

911 Dispatcher Personnel

- Low pay, high turnover, high stress
- Systems must be *very easy* to learn

System Testing Advice

- Set-up during lowest-volume times of day
- Be able to SHUT IT DOWN if something big happens

3.2.2 Observation results

Since so much of the observation notes are relevant, please just refer to them in the appendix in sections 12.5 and 12.6.

4. User Characteristics

4.1 Summary

The user analysis for this effort has been divided into two categories—callers and dispatchers. Callers are all persons who are able to call 911 and dispatchers are trained professionals working in a dispatch office.

Due to the exceptionally vast size of the caller user population, this group should be expected to contain persons with disabilities (physical or cognitive), children, the elderly, as well as able bodied individuals of both genders. This group will also contain individuals with various levels of visual acuity—ranging from total blindness to perfect vision. Given the nature of calling 911, environmental stress factors are also an issue that will invariably drive behavior patterns of individuals in this group. As they call, they may find themselves frightened, injured, of fearful for a loved one's life and therefore one cannot assume that their regular phone habits would be in play. Since every individual is different and represents a differing set of life experiences and disaster preparedness, the degree to which these factors will affect user behavior for the caller group is difficult to determine. This is also challenging in that it must be predictive because one cannot accurately simulate the stress factors involved in an empirical study to observe how users will react.

The dispatcher group represents a much more specific demographic than the caller group. Individuals in this group can be either male or female and must be highly trained to operate effectively in their role. They must have visual acuity necessary to effectively work with multiple computer screens (perhaps across a room), and must have physical attributes enabling them to sit at a complex workstation for long periods of time. According to dispatcher training resources (made available through The Emergency Dispatch online group), these individuals must be able to:

1. Type at least 35-40 words per minute
2. Type what they are hearing while carrying on a conversation
3. Type effectively while talking
4. Develop advanced listening skills
5. Read, listen, and type multiple (sometimes unrelated) pieces of information at the same time
6. Carry on up to five conversations at one time
7. Memorize a variety of codes and symbols common to law enforcement / rescue
8. Perform CPR and First Aid and be able to coach others over the phone
9. The ability to manage physiological factors (desire to urinate/defecate, ward off sleep during boredom)
10. Maintain a standard of visual acuity allowing for effective use of the agency specific system being worked with.

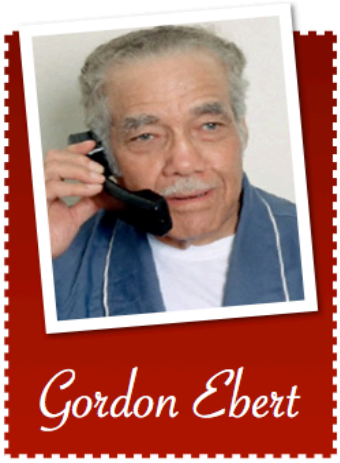
Given the stressful environment that dispatchers often work in, and in light of the list above, interviews have revealed that there is a very high turnover rate for dispatchers.

For the purposes of this specific effort, six individual personas have been developed representing appropriate metrics of the users involved across the two groups. The Persona User Characteristics table depicts important user metrics using the personas as a basis for

comparison while the General User Characteristics table represents more general perspective for the user groups that each persona represents. Since there is no legacy system for the caller group, the task analysis and discussion to follow will focus heavily on the information pertinent to the dispatcher group.

4.2 Personas

911 DISPATCHER APPLICATION RESOURCE PERSONA



Age 82

Gordon Ebert

About Gordon

After being discharged from the Army, Gordon became a traveling salesman before retiring into an assisted living complex. He enjoys playing with his young grandchildren at his farmhouse out of the city that he visits once a month. Gordon is a Korean war veteran, and in a wheelchair.

Gordon's Behavior

Gordon's disability does not prevent him from continuing to drive his car, although he does find it frustrating to use the wheel chair lift in his trunk. Until his sons forced him to buy an iPhone, his landline and a wheel chair lift were the only two pieces of technology that Gordon ever interacted with. He remains skeptical of the iPhone, but is warming up to the fact that, "that internet thing" can be carried anywhere he goes so he can check his email for messages from his grandchildren.

Gordon's Information Needs

Gordon needs his information to be accessible and simple to understand. His iPhone often confuses him and he really doesn't understand that phone calls made on it are not on "the internet," since he saw one of his friends use Skype to communicate with their family. With failing eyesight, Gordon needs information displays to be large and easy to read. The one thing he likes about his iPhone is all the icons so he doesn't have to read, he just wishes they all were larger.

Image courtesy of Scrape TV

911 DISPATCHER APPLICATION RESOURCE PERSONA

Sena Tirol

About Sena

Sena is a very active business woman. She has started seven businesses and currently owns three. She got a very early and advantageous start in the business world when she inherited her parents' multi-million dollar fortune and estate at a young age after a tragic car accident. Sena is a loner and has a limited social circle.

Sena's Behavior

Sena interacts with a variety of handheld and small portable electronic devices on an hourly basis as she relentlessly manages all of her assets and businesses. She is often found in her limo multitasking across a laptop and three cell phones corresponding to each of her businesses. Sena is always on the go wouldn't be too likely to remain on the phone with any one person for more than a minute or two as there are many others waiting to speak with her around the clock. She doesn't consider herself someone who would get involved in someone else's emergency.

Sena's Information Needs

Sena needs her information from a variety of sources quickly and efficiently. Because she constantly is switching between information mediums, perhaps 50% of the time she is dividing her attention from her current task. While slightly dated, Sena prefers backup phones with physical buttons so she can use the tactile feedback to text and type others while speaking on her primary phone—an Android.

Image courtesy of N97 Fanatics

911 DISPATCHER APPLICATION RESOURCE PERSONA

Age 7

Tyler Marshall

About Tyler

Tyler is an active little boy. At age seven, he plays on two sports teams and is learning to play the trumpet. He is a low performing student at his local elementary school–not because he isn't intelligent, but because he is bored with school and isn't being challenged. He lives in a large house with mother and step-father.

Tyler's Behavior

Tyler does not have much down time between all of his activities, but on the weekends he spends a lot of time playing computer games with his friends. He also considers himself an expert at all things Playstation, and enjoys competing against his step-father in "shoot-em-up" games. Apart from this, Tyler does not interact with technology as much as his friends. His parents are considering giving him a cell phone on his eighth birthday so he can call them to pick him up from practice. Tyler remembers a "call 911" presentation that was at his school, and being shy with strangers, secretly is afraid to ever call—even in a real emergency.

Tyler's Information Needs

While Tyler does not play a lot of video games, he does play a wide variety of games and is therefore familiar with a range of interfaces. He needs information on phones and other systems to be in the displayed in the same manner as his video games to hold his attention. He has been disciplined several times for borrowing his parents' iPhones without permission and messing up data on them. Tyler needs a

Image courtesy of the DailyMail

911 DISPATCHER APPLICATION RESOURCE PERSONA

Robert Myers

Age 42

About Robert

Robert is 42 year old. He is a single father and works for a small city's dispatch. In his spare time he enjoys reading to his daughter and watching football with his friends. His wife was a US Army Sergeant who was killed in Iraq in 2008. Every year he goes to a memorial service for her held at his local church.

Robert's Behavior

Robert is extremely driven, but can also be impulsive at times. He loves his daughter, but often gets too tied up in his work to spend much time with her. Robert has been a dispatcher for many years and is very hands on. He may enjoy reading with his daughter, but he doesn't like reading much on his own so when technology doesn't behave as he expects, he won't read the manual. He prefers either learning by doing, or not at all. He does not use technology or handheld devices much at all outside of the office, and figures that if he did, he'd just be distracted from it with other things anyway.

Robert's Information Needs

Due to his impulsivity, Robert often does things sloppily and would prefer a system that is very fast and intuitive. His job requires him to work with computer systems frequently, specifically a computer aided dispatch application. Robert often wishes it was faster and less complex. He has been reprimanded in the past for slow performance on the job. He secretly feels that he is less capable than his colleagues so he needs a system he can master. He thinks of the computer aided dispatch as just a larger more confusing version of his cell phone – which he also doesn't understand.

Image courtesy of ihicimo blogspot

911 DISPATCHER APPLICATION RESOURCE PERSONA

Age 31

Kyla Flynn

About Kyla

Kyla works at a major dispatch center in a large city. She enjoys playing her guitar and is an aspiring vocalist. Kyla loves spending time with her boyfriend John, and the rest of her many friends. She drives a Mustang convertible that her father gave her, and frequently likes to joy ride alone. While she works as a dispatcher, she dreams of becoming a musician.

Kyla's Behavior

Kyla is social person, and if she is not with her friends she is chatting with them on the internet or her phone. For this reason, she has become very skilled at multitasking with digital devices and therefore excels as a dispatcher. She often becomes frustrated when she watches others complete their tasks at the office because she knows she can complete them faster and more efficiently. Kyla is capable of typing over 50 words per minute.

Kyla's Information Needs

As a power user of every system she interacts with, Kyla needs the systems to display information to her as quickly as possible. She will become very impatient if any piece of technology makes her wait to do anything. As a perfectionist, she also expects system information to be correct. Kyla's experience with dispatcher software and tools was frustrating at first, however familiarity has made her accustom to how most of the different kinds around her city work–so now she does not give them a second thought.

Image courtesy of collegesurfing.com

911 DISPATCHER APPLICATION RESOURCE PERSONA

Age 27

Vera Reynolds

About Vera

Having graduated from the Air Force Academy, Vera became a dispatcher after a medical condition disqualified her from becoming a pilot. Vera enjoys her job and considers her brief military service as an asset to her current skill set. She works in a dispatch office serving a medium sized city.

Vera's Behavior

Vera's disability does not prevent her from performing very well as a dispatcher, although she does find it frustrating that those around her treat her as a dependent. This treatment motivates Vera to excel at her job to prove them wrong. Vera is detail oriented and will only finish a task if she thinks she is doing it properly. Although she has a wide range of experiences with software tools in the Air Force, Vera is easily annoyed when a system does not function the way she thinks it should. Because her father is a disabled veteran, her greatest pet peeve is encountering non-accessible machines in her day to day life.

Vera's Information Needs

Vera needs system information to be accessible, fast, and readable. Because of her perceived status as a person with disabilities, Vera needs machines that make her feel independent. Building on her experience from Air Force systems, Vera is not afraid of technology and has no trouble understanding complex systems and managing them under stress.

Image courtesy of Burke Locksmiths

4.3 User Characteristic Tables

4.3.1 Persona User Characteristics

Persona	Caller Gordon Ebert	Caller Sena Tirol	Caller Tyler Marshall	Dispatcher Kyla Flynn	Dispatcher Robert Myers	Dispatcher Vera Reynolds
Age	82	37	7	31	42	27
Sex	Male	Female	Male	Female	Male	Female
Physical Limitations	Uses a wheel chair, limited eye sight	None	Small stature	None	None	Declared unfit for piloting aircraft
Educational Background	U.S. Army combat veteran: Korea, traveling salesman	Business owners, highly educated	Limited education currently in grade school	Highly skilled in technical field, musical training	College degree	Graduate of Air Force Academy, knows accessible systems
Computer/ IT Use	Limited exposure to devices	Highly adept computer skills and advanced phone use	Familiar with video games and basic phones only	Very fast and efficient highly skilled computer user	Is capable of using advanced systems, but is often confused	Manages complex computer systems under stress effectively
Motivation	Low, is content with limited functions	Very high, makes use of all features	High, desires to learn more	High, a power user	Medium, not willing to learn new software	High, is making a name for herself at the office
Attitude	Indifferent	Impatient	Curious	It must be perfect	Willing to settle	Must perform better than others

4.3.2 General User Characteristics

Persona Represented	Elderly, visually & physically impaired	Able bodied & energetic	Children	Highly skilled performing dispatcher	Medi ocre performi ng dispatch er	Dispatch er that is new
Age	65+	variable	variable	variable	variable	variable
Sex	Male & Female	Male & Female	Male & Female	Male & Female	Male & Female	Male & Female
Physical Limitations	Perhaps uses a cane or wheel chair, relies on assistive tech for sight and hearing	None	May or may not have a physical limitation	Most likely fully able bodied	Most likely able bodied, but may have difficulty reading or hearing	Most likely fully able bodied
Educational Background	variable	variable	limited	variable	variable	variable
Computer/ IT Use	variable, but most likely limited	variable	variable, but most likely limited	Uses computers effectively on a daily basis	Uses compu ters on a daily basis	Uses compu ters on a daily basis
Motivation	Most likely not motivated to use new tech	variable	variable, but most likely willing to new tech	High, has an interest in seeing systems improve	High, has an interest in seeing systems improve	High, has an interest in seeing systems improve
Attitude	variable, reluctance	variable	variable	variable, may be opposed to change	variable	variable

5. Constraints

5.1 Constraints on Design

There are a number of constraints on the design of our system based upon our requirements gathering. The primary constraint is that in order to be useful, our system must interface with the existing systems as much as possible. This includes the existing SQL database back-end and the existing CAD software, which we are not designing a system to replace. Furthermore, the communications center is already extremely crowded both in respect to a lack of space and in terms of number of systems already running. Thus, our system will need to fit amongst the existing systems since we wish to test the system within its target environment.

5.2 Constraints on Design Process

There are four primary constraints on the design process of our system. The first is that we are designing a system for a working 911 dispatch center. This means that any testing we do has to be able to be shut down at a moment's notice if a large-scale emergency event were to take place. Our testing is further constrained by the fact that testing our system by creating a "real" emergency is not practical, feasible, ethical, or moral. Thus we will have to work with the Georgia Tech Police Department to develop realistic scenarios, they will still be simulated. Furthermore, while we have access to GTPD's Communications Office, who have been extremely open to helping us in any way they can, we do not have that same access to the officers of the GTPD or to the fire and ambulance services with whom GTPD contracts. We also are constrained by the time-frame of this project as an element of the CS6750 class.

6. Implications

The gathered data from our two primary methods and their analysis has led to several conclusions. When considering the specific performance attributes, relevant Knowledge, Skills and Abilities, challenges with the current user interface of computer aided dispatch, and work environment for dispatchers, the following areas were identified as germane objects for special design consideration.

The current user interface presents several challenges to the users which are outlined in the Current User Interface Critique section of this document. Taking these insights into consideration, the design of our system will accommodate many of these challenges. For instance, if touch screen interfaces are deployed, they will offer redundant mouse and keyboard input. The new system will avoid creating a new training burden for dispatchers by finding commonality with current systems. Due to the cluttered and busy environment that dispatchers are currently working in, our design will strive to have a very small footprint in the workspace. Our system will be designed to not include additional alarms for feedback as the current setup already deploys too many alarms, and to add more not only confuses users but reduces the unique impact that an alarm tone is designed to illicit. Our design will attempt to include applicable design standards and guidelines regarding display footprint and layout, means of input, and feedback systems (alarms).

Because we believe that our personas accurately portray the target user groups involved, we will rely on them (and the relevant Knowledge, Skills, and Abilities analysis) to drive the interaction design and information needs our design attempts to address. It will remain important moving forward to continue to focus on the information needs of potential 911 callers as well (even though the current work focuses heavily on the dispatchers since that is where a legacy system exists). We will continue to foster our relationships with our contacts and subject matter experts at the Georgia Tech Police Department as well as the Georgia Tech Research Institute. Their guidance moving forward will be essential to creating a realistic operational environment to simulate our scenarios, and ensuring that our future prototypes are of an appropriate scope.

The final manifestation of our design focus moving forward reflects the above observations.

7. Functional Requirements Summary

FR1. The system should display a comprehensive representation of ongoing activities
- FR1.1. The system should display a summative representation of incoming multi-media
  - FR1.1.1. The system should display the location of multimedia source
- FR1.2. The system should display a summative representation of ongoing calls
  - FR1.2.1. The system should display the location of callers
- FR1.3. The system should display a summative representation of open incidents
  - FR1.3.1. The system should display the location and type of incidents
- FR1.4. The system should display a summative representation of dispatch units
  - FR1.4.1. The system should display the location and status of officers
  - FR1.4.2. The system should display the location and status of ambulances
  - FR1.4.3. The system should display the location and status of fire trucks

FR2. The system should display media associated to a particular object
- FR2.1. The system should display media associated to a particular caller
  - FR2.1.1. The system should display texts associated to a particular caller
  - FR2.1.2. The system should display photos associated to a particular caller
  - FR2.1.3. The system should display videos associated to a particular caller
- FR2.2. The system should display media associated to a particular incident
  - FR2.2.1. The system should display texts associated to a particular incident
  - FR2.2.2. The system should display photos associated to a particular incident
  - FR2.2.3. The system should display videos associated to a particular incident
- FR2.3. The system should display media associated to a particular location
  - FR2.3.1. The system should display texts associated to a particular location
  - FR2.3.2. The system should display photos associated to a particular location
  - FR2.3.3. The system should display videos associated to a particular location

FR3. The system should enhance (rather than replace) existing communication with all parties
- FR3.1 The system should allow communication via MMS capable devices
  - FR3.1.1 The system should allow sending text to MMS devices
  - FR3.1.2 The system should allow sending photos to MMS devices
  - FR3.1.3 The system should allow sending videos to MMS devices
- FR3.2 The system should allow communication via smart-phone app
  - FR3.1.1 The system should allow sending text to app
  - FR3.1.2 The system should allow sending photos to app
  - FR3.1.3 The system should allow sending videos to app
  - FR3.1.4 The system should allow sending emergency notifications to app
  - FR3.1.5 The system should allow sending data to app (i.e. escape routes)
- FR3.3 The system should allow communication with third parties (i.e. officers, dispatch units)
  - FR3.1.1 The system should allow sending instructions to third parties
  - FR3.1.2 The system should allow sending photos to third parties
  - FR3.1.3 The system should allow sending videos to third parties
  - FR3.1.3 The system should allow sending geolocations to third parties
  - FR3.1.3 The system should allow sending requested data to third parties

8. Functional Requirements and Task Analysis

8.1. Knowledge, Skills and Abilities (KSA's)

Task #	Operator Task	Knowledge
1.0	Enter/modify information on a computer form	Communications, User Interface, Navigation, Mechanical
2.0	Write information onto a paper form	Communications, Mechanical
3.0	Confirm what has been entered into computer form	Communications, User Interface, Navigation, Mechanical
4.0	Submit computer forms	Communications, User Interface, Navigation, Mechanical
5.0	Print computer forms	User Interface, Mechanical
6.0	Look up basic individual information (birthday records, etc)	User Interface, Navigation, Mechanical
7.0	Activate door entries	Communications, Mechanical
8.0	Use telephone	Communications, Mechanical
9.0	Use radio	Communications, Mechanical
10.0	Send information over radio/ computer/telephone	Communications, User Interface, Mechanical

Task #	Operator Task	Skills
1.0	Enter/modify information on a computer form	Critical Thinking, Coordination, Reading Comprehension, Computing
2.0	Write information onto a paper form	Critical Thinking, Coordination, Reading Comprehension, Writing
3.0	Confirm what has been entered into computer form	Critical Thinking, Coordination, Reading Comprehension, Computing
4.0	Submit computer forms	Reading Comprehension, Computing
5.0	Print computer forms	Reading Comprehension, Computing

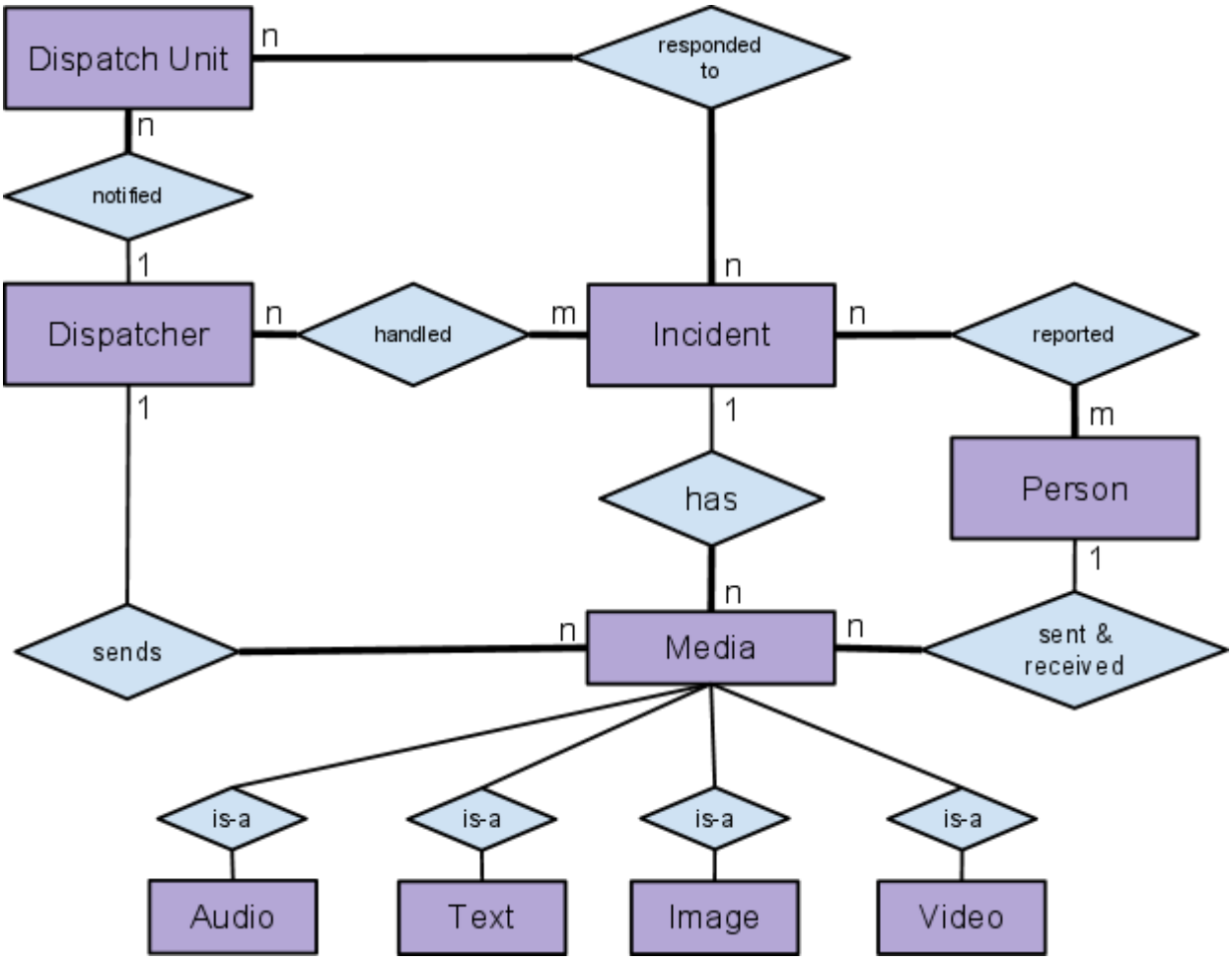
6.0	Look up basic individual information (birthday records, etc)	Critical Thinking, Coordination, Reading Comprehension, Computing
7.0	Activate door entries	Spoken Word, Coordination, Auditory
8.0	Use telephone	Spoken Word, Coordination, Computing, Critical Thinking, Auditory
9.0	Use radio	Spoken Word, Coordination, Computing, Critical Thinking, Auditory
10.0	Send information over radio/ computer/telephone	Critical Thinking, Coordination, Reading Comprehension, Computing, Spoken Word, Auditory

Task #	**Operator Task**	**Abilities**
1.0	Enter/modify information on a computer form	Deductive Reasoning, Near Vision, Problem Sensitivity, Time Sharing, Upper Body Mobility, Fine Motor Control
2.0	Write information onto a paper form	Deductive Reasoning, Near Vision, Problem Sensitivity, Time Sharing, Upper Body Mobility, Fine Motor Control
3.0	Confirm what has been entered into computer form	Deductive Reasoning, Near Vision, Problem Sensitivity, Time Sharing, Upper Body Mobility
4.0	Submit computer forms	Near Vision, Time Sharing, Upper Body Mobility, Fine Motor Control
5.0	Print computer forms	Near Vision, Time Sharing, Upper Body Mobility, Lower Body Mobility, Fine Motor Control
6.0	Look up basic individual information (birthday records, etc)	Deductive Reasoning, Near Vision, Problem Sensitivity, Time Sharing, Upper Body Mobility, Fine Motor Control
7.0	Activate door entries	Deductive Reasoning, Near Vision, Problem Sensitivity, Upper Body Mobility, Fine Motor Control
8.0	Use telephone	Deductive Reasoning, Near Vision, Problem Sensitivity, Time Sharing, Upper Body Mobility, Fine Motor Control

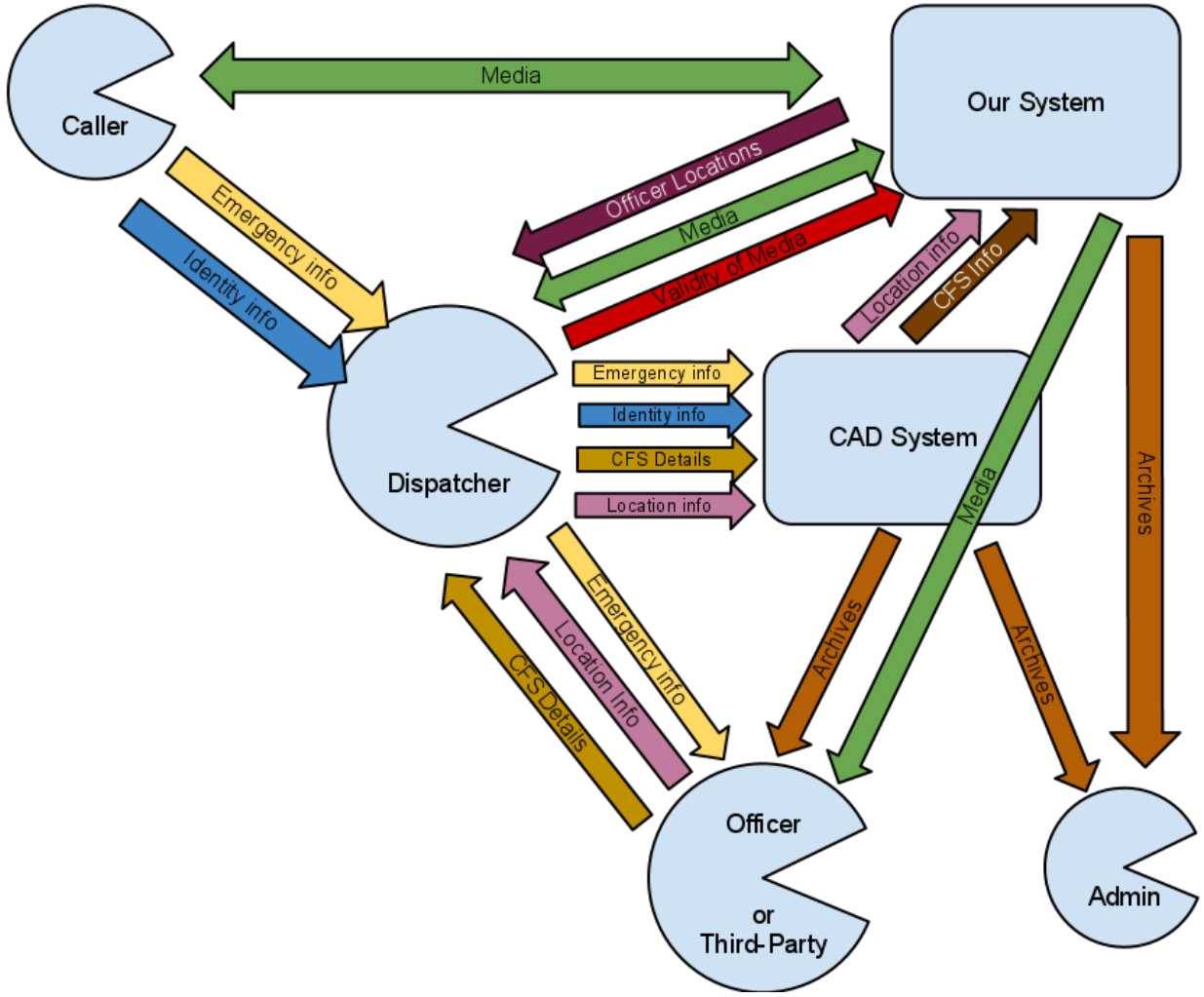
9.0	Use radio	Deductive Reasoning, Near Vision, Problem Sensitivity, Time Sharing, Upper Body Mobility, Fine Motor Control
10.0	Send information over radio/ computer/telephone	Deductive Reasoning, Near Vision, Problem Sensitivity, Time Sharing, Upper Body Mobility, Fine Motor Control

While the analysis of Knowledge, Skills, and Abilities in this aspect of the Task Analysis above only covers aspects of the system witnessed during the observation period, and they are broad headings, they do reflect an accurate picture of the level of expertise expected from dispatchers. While upper level, this particular sampling of Knowledge, Skills, and Abilities showcases the relatively advanced operational capabilities demonstrated throughout the observation period.

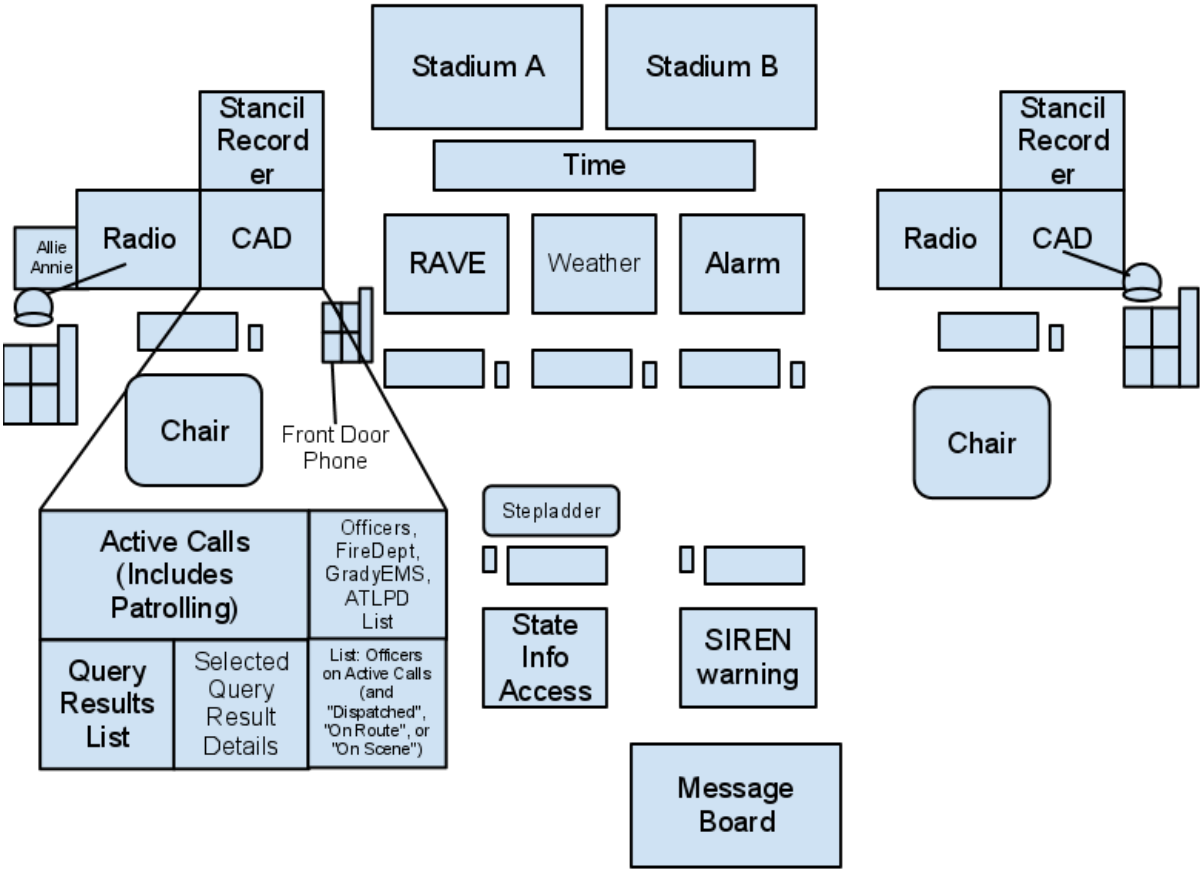
8.2 Object Model of Proposed System



8.3 Distributed Cognition Model of Proposed System



8.4 Existing Dispatcher Environment



9. Critical Use Cases

handleIncomingMultimedia

USER INTENTION	SYSTEM RESPONSIBILITY
	alert user to existence of new multimedia
determine relevance of media	communicate to sender that media was received
Indicate desire to ignore media OR associate media with a CFS	archive media OR display possible relevant CSFs
indicate relevent CSF	associate media with CFS
Indicate desire to respond to sender	display best way to reach sender
respond to sender using best way	

locateMultimedia

USER INTENTION	SYSTEM RESPONSIBILITY
locate multimedia associated with a particular characteristic (caller/incident/etc.)	display recent/incoming multimedia and related objects (callers/incidents/etc.)
filter out irrelevant objects	offer filter options
choose filter options	display filtered objects
choose the appropriate object	display multimedia associated with the selected object

transferMultimediaCallerToDispatch

USER INTENTION	SYSTEM RESPONSIBILITY
Indicate desire to send media	Provide choices of media types to send
Select form of media	Provide choice of existing media or new media
choose from existing media OR create media	selection of media OR support creation of new multimedia
send media	transfer media to recipient provide feedback that media was delivered or failed to be delivered

locateOfficers

USER INTENTION	SYSTEM RESPONSIBILITY
	display locations of officers
determine closest officer to an event	display location of incident clearly indicate nearest officer to incident

transferMediaFromDispatch

USER INTENTION	SYSTEM RESPONSIBILITY
	display current events
indicate relevant event	display available relevant media display available recipients
indicate media to send indicate intended recipients	
send media to recipient	transfer media to recipient provide feedback that media was delivered or failed to be delivered

10. Usability Goals

Goals (ordered by importance)	Description	Testing
Effectiveness	The system is obviously useless without being effective at its goals.	• Time required for actions • Accuracy of actions (did the user accomplish what he or she intended) • Number of entries of single piece of information
Efficiency	The system must be efficient, as emergencies require rapid response and the target environment is too busy to be slowed down by one of its many systems, let alone the one that is new.	• Time required for each critical use case • Time required to move from CAD system to our system and back
Utility	It is important that the system provide the utility to perform operations that the current system lacks, since otherwise there is little reason to use our new system in addition to the existing CAD system.	• Qualitatively assess perceived utility by potential users • NASA TLX
Learnability	The system must be easily learnable by the dispatchers who are the target users; our requirements gathering has demonstrated that dispatchers often do not memorize every detail, as long as it is easy to look up the relevant information (for example, uncommon call-codes and current officers on duty).	• Time required to know what functions the system provides • Qualitatively measure knowledge transfer from existing systems • Time required from first introduction to the system until able to perform critical use cases effectively
Memorability	While not as critical as learnability, memorability is still important for the highest-level tasks in order to save time and increase the efficiency of the system.	• Time required to know what functions the system provides after one week • Time required from first start-up of system to perform critical use cases after one week
Safety	Finally, the system should be safe, both in terms of robustness as well as in terms of not being uncomfortable for the user.	• Ensure that workspace meets standardized ergonomic guidelines (OSHA Workplace Design Standards) • Qualitatively assess comfort of users when using the system

11. Reflections

This portion of the design process presented the design team with several challenges. First, as we proceeded, we deemed it necessary to make changes to our methodology changing one of our projected primary means of data collection. Initially our two data collection methods were going to be a interviews with subject matter experts (dispatchers and public safety IT experts) followed by a survey of those who have called 911 in the past and those who might in the future. We chose to modify this approach and opt for a contextual inquiry rather than the survey for several reasons:

1. The value of the information gathered from the interview process exceeded our expectations and was such that we realized that an observation in the form of a contextual inquiry was necessary to supplement it.
2. We realized through the interview process that in order to develop a relevant and useful system that a careful inspection of the current systems and tools being used by dispatchers was necessary.
3. It was impossible to guarantee that among the respondents of the survey that the two strata being examined (those who had called 911 and those who had not) would be equally represented in the data. For instance, in our pilot testing, nearly all the respondents had never dialled 911 and therefore could only offer conjecture on what they expected to happen. While this would have been worth noting, data about real experiences were more desirable to the team.

We were fortunate to be able to work closely with the Georgia Tech Police Department's Communications Center which has been pivotal in allowing us to have both direct access to an active dispatch center. GTPD has been very enthusiastic since our first contact with them in improving and augmenting their existing infrastructure and abilities.

Division of Labor:

Interview Question Generation: Gabriel, Gheric, Stuart, Chad
Survey Question Generation: Gabriel, Gheric, Stuart, Chad
Communications: Gheric
Survey Generation: Chad
Presentation: Stuart
Interview Conductors and Initial Observers: Gabriel, Gheric, Stuart, Chad
Observers: Gabriel and Chad
Part I Document Generation: Gabriel, Gheric, Stuart, Chad

12. Appendix

12.1 Questions for interview with GTPD's Walter Warner (Communications Director)

The following questions will inform the design of a user interface for the emergency dispatcher app:

What are the various tasks that you perform as a dispatcher?
Do you typically perform any of these simultaneously?
(If yes and not provided) Which ones?

Can you walk me through, step by step, a typical call?

If any of the following are not covered:
What contextual/situational information is immediately desired in the event of a 911 call?
How do you determine the nature of a call?
Do you categorize it in the system? If so, how?

How often is a caller unable to adequately describe their situation?
How often is a caller unable to vocalize their emergency?
Can you describe some examples of these types of cases?

Do you have to maintain continuous communication with throughout the progression of an emergency with anyone besides the caller?
If so, who?
Do you ever need to look up information about prior events (recent or otherwise)? If so, how often and why?

Are most incoming calls received on cell phone?
How often do you give information or instructions to a caller? What are some examples?
How do you determine what information is needed, and where do you retrieve the information from?
How often does the caller seem to be confused about the information/instructions you are giving them?
How often are instructions carried out correctly or incorrectly by the caller?

How do you handle multiple reports for the same emergency/event?

Other than the callers, who do you communicate with on a daily basis in performing your duties as a dispatcher?

How often must you fulfill requests for information from various parties (police force)? What is the nature of these requests?

What are some of the positives and negatives about the experience working as a dispatcher and fielding calls?

What is the current operating environment for you when fielding calls?
How would you improve the current system?
What do you like about the current system?
Would real-time photos or video of the caller's situation be useful to you during an emergency call?
Would it be beneficial if you were able to send multi-media (text, photos, videos, animations) to the caller (for example, in order to give them instructions or explain procedures)?

Is there a response time goal that dispatch aims to achieve in answering and responding to calls? (ie: Fire = time X, EMS = time X, Burglary = time X)

12.2 Questions for interview with GTPD's Steve Travis (IT Specialist) and GTRI's Jay Sexton (Senior Researcher)

The following questions will inform the design of a user interface for the both apps:

How robust is the dispatcher and emergency response system?

What are the needs/desires of IT professionals?

What are differences in the infrastructure to respond to a mobile vs. landline call? What information is received from a mobile phone? Do you receive GPS coordinates?

Are there APIs in place for any data (e.g. emergency unit vehicle locations, license plates/ registrations)? How are these accessed? Is data stored in a central database?

How long do you save history of emergency calls to 911?

Who are the current service providers for emergency IT? Can you comment on your opinions of any of them? Likes, dislikes? What features do they provide that you see as "cannot live without" or "never used"?

Are there any areas in which you see something missing? (This can be as imaginative as you'd like)... examples: live video streams, futuristic systems, etc.

How does the GTPD department interact and share information with the Atlanta Police? county? state? other agencies?

12.3 Responses for 02/01/12 interview with GTPD's Walter Warner (Communications Director) and Steve Travis (IT Specialist)

Standard Call

- Campus phone 911 (<50%)
    - call comes to GTPD, includes location info down to room number
- Cell phone 911 (>50%)
    - ATLPD → GTPD along with any info ATLPD has gathered, ATL stays on the line
- Smart911
    - RAVE911 info comes to GTPD

- ATL has their version
- Profile info for anyone signed up for the system
- Panic feature

- ATL can ping cell towers, GTPD cannot
- Questions:
    - What is the emergency?
    - What does the perp look like?
    - Are there any weapons?
- GT: Dispatchers handle all aspects of the call
- ATL: One person answers phone and transfers
- Dispatcher cannot look up the number of the caller
    - Backend-generated reports can see the number

Computer Assisted Dispatch (CAD)

- Mouse+Keyboard
- Uses a set of Call Signal Codes
    - memorized, on reference sheets, searched using a search box
    - each agency has their own, though there are similarities
    - miscategorization especially when the situation “seemed like one, but really was another
    - more serious code trumps less serious code
        - “ideal for keeping track of that one particular code”
        - e.g. chemical spill trumps fire
    - two signals of equal importance, officer on scene makes the decision
- Calls stay ‘Open’ until an officer closes it
    - e.g. “Accident Report Completed”
    - Usually requires an officer on scene
- Multiple Callers: attempt to handle them all, but only two dispatcher seats
    - Determine if same or similar incident → same CAD call instance
    - Determine if anything new to offer
- Pop-up boxes based on signal code to make sure the correct questions are asked
- Mapping feature is currently down
- SQL Backend on Windows Server
    - “Storage is cheap.”
    - *Everything* is recorded
    - Nothing is purged
    - Administrators can access full history
    - Dispatchers can access last 45 minutes
    - Integration-wise: pulling yes, pushing no
- Problems with current CAD system:
    - No real problem besides lack of updates and support
    - Thus, looking to replace it
- Key feature:
    - Being able to pull up officers’ activities sequentially
- Wasted features:
    - “utilized up to its capability”
    - no real “bells and whistles”

- Features requested:
    - Mapping feature
        - Real-time
        - seeing officers' locations
        - sharing info would be really helpful

Switchboard built into the phone system

- Key is to answer as quickly as possible
- Entities commonly communicated with:
    - GradyEMS
    - Environmental Health+Safety
    - Facilities
    - ATL Fire
    - Animal Control
    - Parking+Towing (emphasis)
    - Counselling Center
        - GTPD is the after-hours switchboard for them
        - e.g. suicide watch
    - Dean of Students
- Paging System: Let certain people know what's going on
    - SMS-driven
    - Officers
    - President
    - Chief

Medical Emergencies: conference in Grady EMS

- GTPD sends an officer
    - officers are CPR and First-Aid certified
- Grady determines whether to send ambulance or firetruck
- GradyEMS prioritizes (e.g. upset stomach lower than heart attack)
- Stamps Health Center is only involved if person is already there
- Ambulance always used for transport for liability reasons
- Questions:
    - "Is the person concious?"
    - "Is he or she breathing?"
- Sending pictures or video would be helpful

GTPD can get anywhere on campus in 3 minutes

GTPD: "*Ideally* two dispatchers."

Desired Improvements:

- new software
- definitely need two dispatchers

Officers

- Each officer patrols a zone
    - Ideally stay in zone
    - Can leave zone to backup
    - Can leave zone if another zone's officer is tied up
- Officers know where each other are using GPS in car and radio
- Toughbooks in cars, never leave the vehicle
    - Notepads on the scene
    - Official (photographer/camera) if pictures are needed
    - Sometimes on a cameraphone

GTPD Capabilities

- Running tags, VINs, name/dob lookup, buzzcard#, weather
- Officers have limitted capabilities in the cars
    - but even then, are often away from the car
    - some just prefer to ask dispatch

Cell Phones

- Supervisors: Androids
- Officers: Personal Phones
- not using an apps currently

RADIO is #1

- one channel
- one big button on a boom-mic
- dispatcher asks officer to call if something needs to be explained privately

SIREN warning system not controlled by CAD

LoJack: vendor calls GTPD with info

Any type of realtime information would be helpful

- Currently all you can do is call
- No environmental knowledge currently
    - *but would definitely be useful*
- Some systems do support MMS
- RAVE companion only supports SMS
- Ideally dispatcher would be able to send information to the officer

Regarding Child Lung Puncture Story

- Really depends on the person performing
- Hearing vs. seeing
- "If you're having a heart attack, taking the time to watch an animation isn't gonna work."
- It's always been done over voice

Whole building is on a generator

Emergency Preparedness
- Separate, though technically part of GTPD
- Advisory capacity

Watch Commander
Incident Commander
- determine whether SWAT units are necessary
- if GT's team is off duty, ATL and MARTA have teams

12.4 Responses for 02/03/12 interview with GTRI's Jay Sexton (Senior Researcher)

His Background
- Interoperability/Communications
- Voice
- Just started a survey of NextGen911 (NG911)

History of 911
- 911: auto-connects to public safety
- Enhanced911 (E911): connect and location (worked well for landlines)
- TTY machines for the deaf (no one uses them anymore, they text)
- E911-2: Cellphone providers provide location w/in X ft w/in Y minutes
- VOIP-911: Third-party handles 911 location
- NG911: What can we do now?

Public safety is often 2-3 generations back
- less of a problem when tech moved slower

NG911
- Agencies
    - NENA: National Emergency Number Association
    - US Dept of Transportation ITS
    - FCC
    - Association of Public Safety Communications Officials (APSCO)
- Features
    - IP-enabled: "well-connected public safety"
    - video, voice, text, stills
- Currently no real standards, so "going to take years"
- "*Ripe for innovation*"

Dispatch Centers
- decent-sized ones: 24 people
- 3 cases for callers: always know where they stand
    - person

- hold message
- busy signal

- How do you ensure continuity of communication with non-voice options?
    - Providers do not currently guarantee texts
- Dispatchers need to know how the information is getting to them (call, voip, data, sms) in order to reply appropriately
- Dispatcher must receive media, vet it, and then forward it
    - All of these processes must be standardized

Dangers to avoid of NG911
- prevent texts from getting lost in the shuffle
- communicate info to field officers
- currently 1 dispatcher to 1 caller (1:1)
- future is 1 dispatcher to 1 caller and all of their information (1:1+*multitasking*)
- CDMA vs. GSM

911 Dispatcher Personell
- Low pay, high turnover, high stress
- Systems must be *very easy* to learn

System must be able to interface between technically-savvy students and less-technical dispatchers

Awareness
- Panic-button phone apps
- Profile/location
- active mic+camera

Evacuation anecdote about going off the predetermined protocalls

Clery Act
- pushing media to students? (pics of perps, etc)
- this makes the platform matter

System Testing Advice
- Set-up during lowest-volume times of day
- Be able to SHUT IT DOWN if something big happens

Touchscreen+Gloves == Problem
- ambulance drivers
- Story of HAZMAT suit obstacle course

12.5 Notes from 02/01/12 short 5-minute informal observation of dispatch center

911 calls come in on 3 911 lines per phone
- one button for ATLPD conference-in

RAVE system

- Purple or blue dot within 10 meters of the person
- REALLY LOUD alarm goes off

Message Board
- TV displaying webpage with scrolling info
- Meant to be used for shifts passing info to next shift
- data is often a year or more old
- BOLO: Be On the LookOut

Stadium CCTV Monitoring
- No alarms, just passive

12.6 Notes from 02/09/12 two-hour observation of dispatch center

Two hours (3:30pm-5:40pm February 9, 2012) Observation in GTPD Communications Office
Alisha, Dawayne (dispatchers) and Walter (supervisor)

Entering Warrant
- Subject was admitted to a hospital but needed to be arrested upon discharge
- On state-records machine, Walter was entering information into a form
- Across the aisle, Walter was writing the same information onto a paper form
- For each entry, he would confirm with Dawayne exactly what was being typed
- When the form was ready to submit, he would press submit and the printer next to it would sound an alarm and then teletype out the results, which constantly were that something was wrong and he would have to modify the results and submit again
- “the system is sensitive to hyphens and grammatical symbols”
- After the system finally accepts the main page, Walter then has to enter in secondary forms, for example, aliases
- “This form needs ⅔ of the record ids”
- The suspect had “a couple different birthdays” which all needed to be communicated to the system
- “I have to say, I hate entering warrants.”
- “Whose case is this?” “Good question...”
- “This should not be this difficult.”

Door, Atrium, and Window
- Gabriel: Lady from maintenance stood at dispatch center door observing, then made eye contact with dispatcher (Dawayne) to enter. Dispatcher responded with door code. Eventually Walter opened door. Distraction to all 3 dispatchers.
- Man who had been arrested sometime in January needed to get some money which had been left in a locker
- A man had been asked to come to the station to meet with a detective who had gone home already and was asked to come back the next morning at 9
- A man came in and asked if GTPD could run a check on his name to determine if there would be any problems when he applied to law schools (apparently his lawyer had advised him to do this). GTPD apparently cannot run background checks. Alisha said he should try ATLPD, which apparently the man had already tried to no avail.

- An ATLPD officer came in asking if there was a notary in the department. He was sent to the Mailboxes, Etc at Tech Plaza up Hemphill.
- A pair of recruits who are starting next week came to pick up their uniforms, which were being kept at the far end of the comm room.
- For each person who comes to the station:
  - person rings the bell outside
  - someone has to pick up a phone next to Dawayne's desk and ask that the front door be opened (even if Dawayne is busy, Alisha would have to squeeze through and use that phone)
  - someone has to find out what the person needs through the window
  - if necessary, the person must be buzzed in though the inner door
- "That door being locked 24/7 is one of the best things that's ever happened." -D
- If you come in and ask to have your license checked out, you can, and you can look at the printed-out report, but you cannot keep it

Larger stations:
- "never have to deal with warrants or people at a window"
- often a set of answerers, dispatchers, and outside-liasons per zone (ATL has 5-6 zones)

Watch Commanders
- Sergeants or Lieutenants
- Have ability to know where each officer currently is
- Officers do not always know where the WC is (so that he or she can check on them)

Phone Call to 2500 Number
- non-911 button lights up, ring A
- Allie Annie Box displays # and location
  - (loc only if available, GTPD can call ATT to have call traced if unavailable and needed)
- Pick up phone, press non-911 button
- "Georgia Tech Police Department, how may I help you?"
- Open up new CFS (bright red button in corner for "Prior CFS")
- Fill in details (name, location, call code)
  - Priority is assigned automatically based on call code, can be modified
  - Select source: 911-Phone-Officer Initiated- ATLPD- Other
  - Often have to type with one hand
- If necessary, use radio to send officer to the scene (e.g. "radio 108" "108" "108 signal 13 state and 11th")
- Enter this into CAD
  - Drag officer from on-duty list onto the call in the call list
  - In the CFS details or creation window, type the unit number into the contact box and change to "on route"
- Conference in Grady by pressing 'C'-Grady-'C'

Phone call to 911
- 911 button lights up, ring B
- Allie Annie Box displays # and location

    - (loc only if available, GTPD can call ATT to have call traced if unavailable and needed)
  - Pick up phone, press 911 button
    - if both dispatchers are on calls, walter grabs phone (happened once)
  - "Georgia Tech Police Department, what is your emergency?"
  - Open up new CFS (bright red button in corner for "Prior CFS")
  - Fill in details (name, location, call code)
    - Priority is assigned automatically based on call code, can be modified
    - Select source: 911-Phone-Officer Initiated- ATLPD- Other
    - Often have to type with one hand
  - If necessary, use radio to send officer to the scene (e.g. "radio 108" "108" "108 signal 13 state and 11th")
  - Enter this into CAD
    - Drag officer from on-duty list onto the call in the call list
    - In the CFS details or creation window, type the unit number into the contact box and change to "on route"
  - Conference in Grady by pressing Grady

Closing an active call

- After call is entered into CAD system
- Once call is ready to be closed
- Right click on active call
- Menu options pop up
- Select Close CFS at top of menu options (most commonly used)
- Enter text on resolution of case (eg. verbal warning issued to traffic stop call)
- Click save
- Call disappears from active call queue in CAD

Phone call using RAVE panic #

  - Alarm on RAVE system goes off (loud)
  - Phone rings (this time no one on other line)
    - Call number on profile which has popped up
  - Location info wasn't available, but if it is, a dot shows up on a map
    - Turns out caller was calling from Massachusetts to test the system

Alarm System

  - Different Machine, sits between the two dispatchers
  - Loud alarm sound
  - Window pops up with description of alarm (e.g. "Toxic Gas")
  - Details window says location as integer (e.g. 30)
  - Look up code in table at bottom of screen (turns out there is no 30, so must be false alarm or a test)

Ocasionally officers will come into the dispatch center to have something looked up

Late Night Calls

  - Often people calling who don't want to wait for the Stingerette

- "It's not that we don't want to give them a ride, we just only have so many officers on duty. And you don't want to have to explain to a parent that their kid got robbed or shot and there wasn't an officer because they were giving people rides."

Radio
- Feedback
  - lightning bolt to indicate dispatcher is speaking on channel
  - yellow speaker icon to indicate traffic on channel from outside world
  - mute button
  - touch-enabled
  - active channel grays out when switching to another channel
  - feedback on in/out traffic still lights up in background
- Accessed
  - using a button at base of boom mic
  - button on floor pressed with foot
- Channels
  - GTPRI: Primary, almost always active and not muted
  - GTSecondary: officers working in an abnormal capacity (eg: undercover), usually accessed with a handheld radio
  - ATL Zone 5: The zone GT is in. Rarely used, but for comunicating with ATLPD in the area for supporting each other. Listened to by Watch Commander ocasionally and usually one field officer.
  - Spec. Events: ATLPD's channel, but they let GTPD use if for events such as football games. Used in the same manner as GTSecondary
- References
  - Communications Center/ Dispatch: usually "radio" sometimes "dispatch"
  - Officers: by unit number (e.g. "108", "88")
  - Spelling things out (names, plate tags) using military alphabet
    - name + spelled out + name + spelled out + name
- Example radio communications
  - "Hey radio, would you re-advise location of that 41?" (41 is an auto accident)
  - "88 to 104"
  - "108 signal 13 state and 14th"
  - "107 name dob" in response to a request from an officer for a person query
    - responded to by: name + spelled out + name + spelled out + name + dob spelled out in numbers + dob spelled out in numbers
- Multi-tasking
  - Entering details about last call (auto accident)
  - Emergency phone line rings
  - Dispatcher responds to call (altercation at library)
  - Continues entering details about last call

Data Sources
- Active duty roster kept on sheet of paper
- CAD System
  - currently active calls

        - includes “Patrolling “+location if officer has radioed that that is what he/she is doing
    - list of officers assigned to calls and whether dispatched, on route, or on scene
- Query Interface
    - Can check:
        - License Plate (Tag)
        - Driver’s License Number (OLN: operating license number)
        - Name/DoB Person lookup
    - Accessed through new CFS dialog or through a button in top right of screen (unlabelled, and next to two other near-identical buttons)
    - Tabs for Tag, License, Person queries
    - Traditional form interface
    - After submitting query, wait for responses
        - Flip through responses til receive one that’s relevant (many are failed searches)
    - Queries using FBI databases, and thus each state’s databases
    - To view, either scroll around the tiny box, or print the report and read the print preview
        - Often need to print anyways since officers use the hardcopy for writing their reports
- Stancil Recorder
    - Interface is called Ten-9 Client (date/time | duration displayed)
    - Records every phone and radio activity
    - if call or dispatcher is on the radio: records which dispatcher
    - has icon indicating radio or phone
    - includes duration of radio or call
    - keeps number for outbound calls
    - can be played back by 1-click on call wanted
    - records are kept by administrator at GTPD for 30 days, then must be requested through OIT

Dispatcher Shifts
- 7a-5p
- 9a-7p
- 7p-5a
- 9p-7a
- Day shift is busier than the night shift
- Day and Night shifts alternate every six months

12.7 Emergency Experience Survey

Page 1

Have you ever been in an emergency situation? *
- Yes
- No
- Prefer not to answer

What do you expect from a 911 dispatcher? *

After page 1
Continue to next page

Page 2

Emergency Questions

Regarding your emergency, what was the emergency? *
What did you do as the emergency started? *(If you do not remember or would prefer not to answer, please write "n/a")
Did you call 911? *
- Yes
- No
- Prefer not to answer

Was the emergency resolved? *
- Yes
- No
- Prefer not to answer

If yes, how was the emergency resolved?(If you do not remember or would prefer not to answer, please write n/a)

After page 2
Continue to next page

page 3

911 Call

Did you use a cell phone to make the call? *
- Yes
- No
- Prefer not to answer

How quickly did the dispatcher answer your call? *
- Immediately
- Short
- Somewhat short
- Somewhat long
- Long
- Very Long
- The dispatcher did not answer
- I do not remember
- I prefer not to answer

Do you remember the conversation you had with the dispatcher? *

- Yes
- No
- Prefer not to answer

If yes, could you please describe that conversation? *(if you do not remember or would prefer not to answer, please write "n/a")

Did you take any actions as a result of the call? *
- Yes
- No
- Don't remember
- Prefer not to answer

If yes, which actions did you take?

How long would you say that the call took? *
- Less than 1 minute
- 1-2 Minutes
- 3-4 Minutes
- 5-6 Minutes
- 7-8 Minutes
- 9-10 Minutes
- Greater than 10 Minutes
- Don't Remember
- Prefer not to answer

Did the dispatcher send a police car, fire truck, or ambulance? *(Choose all response vehicles that were sent)
- Police Cruiser
- Fire Truck
- Ambulance
- None
- Do not remember
- Prefer not to answer
- Other:

If yes, how long did it take to reach you? *
- I answered None, Do not remember, or Prefer not to answer above
- Less than 1 Minute
- 1-5 Minutes
- 6-10 Minutes
- 11-15 Minutes
- 16-20 Minutes
- 21-25 Minutes
- 26-30 Minutes
- Greater than 30 Minutes
- Do not remember

After page 3
Continue to next page

Cell Phone 911 Call Questions

What type of cell phone do you use? *
- iPhone
- Android Phone
- webOS Phone
- Blackberry

- Other App-based phone
- Non-app-based phone
- Prefer not to answer

Which (if any) of the following do you receive on your phone?
- Text Messages
- Picture Messages
- Video Messages

If it were possible, do you think that a dispatcher sending text, pictures, or video to your phone would be helpful? *
- Yes
- No
- Don't Know
- Prefer not to answer

If you would like to receive text, pictures, or video on your phone, which of these three forms would you prefer? *
- Text
- Pictures
- Video
- I would not wish to receive any
- I do not know if I would wish to receive any
- Prefer not to answer

After page 4
Go to page 5 (General 911 Call Questions)

page 5

General 911 Call Questions

What have been your positive experiences with 911 dispatchers in the past? *(Please write "n/a" if you do not wish to answer)

What have been your negative experiences with 911 dispatchers in the past? *(Please write "n/a" if you do not wish to answer)

Have you ever called 911 and had difficulty explaining the situation to the dispatcher? *(e.g. being unable to speak or communicate clearly for any reason)
- Yes
- No
- Prefer not to answer

If yes, could you provide more information?

Have you ever called 911 and had difficulty understanding the dispatcher? *(e.g. being unable to hear or comprehend his or her response for any reason)
- Yes
- No
- Prefer not to answer

If yes, could you provide more information?

After page 5
Go to page 7 (Thank You)

Page 6

Calling 911

Have you ever called 911? *
- Yes
- No

- Prefer not to answer

Page 7

After page 6
Continue to next page

Thank You

Thank you for taking the time to fill out this survey.

12.8 Some elements of existing CAD systems

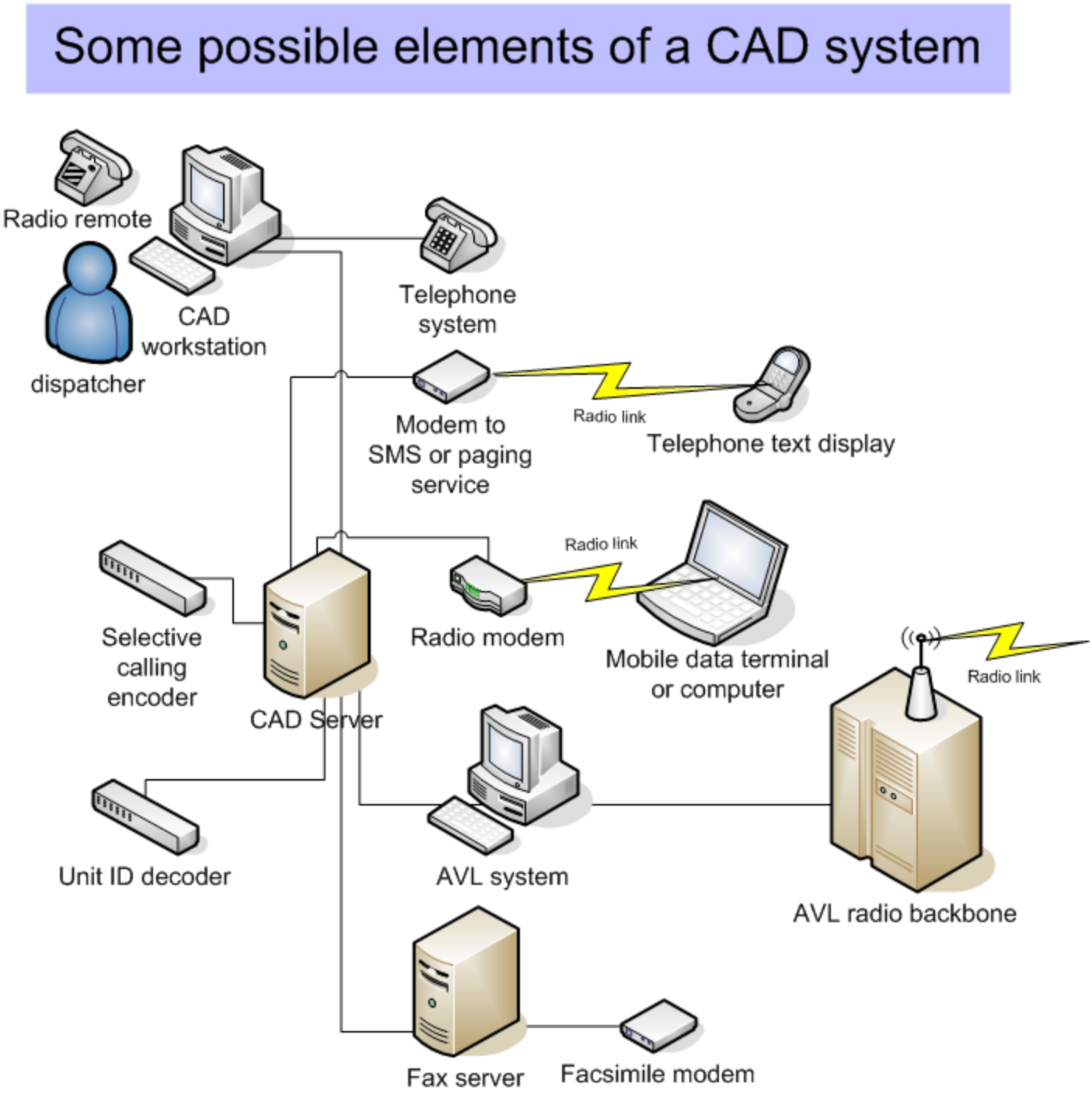


Diagram by David Jordon (http://en.wikipedia.org/wiki/File:CAD_interconnect.png)