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Community Crime Mapping: Increasing Predictive Policing with Dynamic Symbol Sets

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Community Crime Mapping

Increasing Predictive Policing with Dynamic Symbol Sets

A thesis submitted in partial fulfillment of
the requirements for the degree of
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Abstract

Abstract

Crime prevention is an important area of study in our society that plays an integral role in the lives of citizens and the local police who enlist the aid of strategic counter crime plans to tackle the urgency created everyday when crimes are committed. This mode of counter acting crime is termed "problem oriented policing" and is a policing approach where individual pieces of police data are critically examined with the hope that the findings learned will lead to discovering a new and more effective counter crime strategy. Crime mapping is one of these analyzed tools allowing officers to understand criminalistic data and map out individual incidents, crime routes, hot zones and predict where the next crime may occur. Through mapping spatial relationships, predictable policing efforts can be put into effect that cut crime rates by policing areas that need it most.

Crime mapping is a strategy used by most police agencies but it lacks in specific factors most of which is a cohesive unified visual language. It is also restricted to crimes which don't take into account non-criminal police field work, emergency response and search and rescue efforts. Furthermore, the sharing of information between departments becomes problematic as each department customizes their imagery, colors, etc. Perhaps one of the greatest challenges to crime mapping is the element of change. Change allows for patterns to emerge which allow officers to define those patterns and effectively predict future criminal occurrences.

This thesis serves to fill the gap in crime mapping by unifying the strategy with a series of standard icon system sets that span the breadth of law enforcement duties. A dynamic flexible icon system strives to create order and concise visual interpretation between officers and analysts within departments and between departments. The system is flexible, interchangeable and dynamic by addressing one of the most important aspects of change, time. The symbols are based on time of day and also express relative time periods when events occur. By improving the functionality of crime mapping, citizens, officers and communities can become safer.

Keywords

information design, print, symbol sets, icon design, predictive policing, crime prevention, public safety, prevention strategy

Purpose   Graphic design at its core is a mode of problem solving issues associated with communication through the use of type, image and space. Design allows me to channel my creativity into limitless bounds and to challenge myself to solve communication issues as effectively and efficiently as possible. I have always been strongly drawn toward the sensation of visual problem solving especially with the linguistic abilities of a visual language by creating something that is understood by all despite the barriers of spoken language. Design is an outlet of artistic expression, a means of discovery and an inspirational tool that can transcend communication barriers and unite people in a common language.

So that said I have grown quite interested in solving problems that involve data visualization and also involve a positive social impact. Mapping is something that I have more recently come to more intricately deconstruct and focus on as a tool that is widely used in many disciplines for varying social implications. I wanted to develop a design that combines my interests in mapping and symbols to make a positive impact on the community in some way. Thus I found myself focusing on an aspect of the community that always strives for improvement, crime and safety.

Through my research I came across crime mapping as a predictive policing strategy that is employed throughout the country as a deterrent and counter measure to crime. Being new to the subject, I looked deeper into the issues and methodology of crime mapping and found lacking areas and factors that could be developed to more effectively make use of crime mapping as a strategy and help officers become more aware of crime patterns but also incorporate all of the field activity, rescues and response efforts they put forth each day. So my thesis sets out to solve and strengthen the weak points in crime mapping but also add new elements involving time to help officers make our communities safer. My work involves developing a series of four symbol sets that represent crimes, search and rescue data, police officer field activity and first response with the aim to unify a cohesive visual language and time mechanics aspect to be applied to crime maps for law enforcement across the country as a standard. I believe that with a more dynamic, clear and efficiently designed communication system, I will be able to help officers more effectively share information and go about their work more efficiently thus making communities more safe as well as making officers more safe.

Situation

Crime prevention plans are essential tools for law enforcement agencies throughout the United States allowing officers to better understand criminalistic data and formulate counter measures tailored to the data. Crime mapping, in particular, focuses on mapping criminal activity as it occurs and identify hot spot patterns where crime is most prominent.[1] The crime map is Geo-specific depending on the jurisdiction of law enforcement agencies being on the local, county, state or national level.

Through mapping the spatial relationships of crime targets, predictable policing efforts can be put into effect that cut the rate of crime and allow officers to better deter crime on their specific patrol lines.[2] While crime mapping identifies where the actual crime took place, it also details where the perpetrator lives or works. Including perpetrator and victim data is essential to crime prevention mapping as crimes are committed within a criminal's comfort zone.[3]

Crime mapping techniques are meant to allow for law officers to gain a more complete understanding about the criminal activity that occurs along their patrols and a over arching view of their scope of jurisdiction. Mapping criminal activity is typically done at an individual law agency level with map elements that do little to show a unified system as well as factor in a larger aspect of change in the form of time. Ergo, the crime prevention measures that should be derived from crime mapping become confusing and are lacking in their ability to properly communicate not only where crimes occur but when which is an essential aspect of defining criminal patterns.

Furthermore, the system focuses solely on criminal data and does not take into account the full expanse of police duties. Officers of course counter crime but also have other essential community roles encompassing emergency response in many cases be a fire, accident or disaster situation. Police also help or organize search and rescue (SAR) efforts for instances of missing people and also work through field work such as serving warrants, making arrests, and heading investigations. These important aspects of crime mapping are absent and can do well to strengthen community safety and detail specific clues that can perhaps solve issues that have run cold but surely to more effectively protect and serve the community. The amount of customization that occurs within police departments by analysts may work for the individual department's needs but in circumstances where the sharing of mapping data between departments information can become misinterpreted and cause further set backs thwarting effective problem oriented policing. A dynamically time based and unified symbol system of icons in each of the four aforementioned categories, will do well to make crime mapping a viable and clear tool for officers to increase community security.

[1]Perry, Walter L., et al. 2013. "Predictive Policing : The Role of Crime Forecasting in Law Enforcement Operations". CA, RAND Corp. 893-1333.
[2] Ibid
[3] Ibid

Thesis Problem and Solution Statement

Problem

Current crime mapping techniques are meant to allow for law officers to gain a more complete understanding about the criminal activity that occurs along their patrols and an over arching view of their scope of jurisdiction. Mapping criminal activity is typically done at an individual agency level by crime analysts that relay the information to officers in the field. However, each department handles the data differently and analysts develop a symbol system tailored to their own interests. Alternatively, many maps are developed with stock crime symbols which are then modified for a specific department. Furthermore, analysts tend to assign colors to each crime category and thus further distances the overall system from itself and from systems in other departments across the country. Ergo, the crime prevention measures that should be derived from crime mapping become confusing and an array of issues still persist which include:

- A lack of a cohesive unified visual symbol system.
- No standardized system of color coordination for crime categories.
- Disconnect between officers and analysts who may each misinterpret data.
- Disconnect between departments who need to share crime mapping data.
- The breadth of symbols available is limited to crime categories only.
- Crime mapping doesn't include other important and regular police activity such as field work, search and rescue efforts, and emergency response.
- The current system does not attempt to indicate when an event occurs either AM or PM and also a relative time period of an occurrence.

Solution Statement

This thesis has resulted in a series of dynamically flexible icon system sets combined with an analysis of problem oriented policing. This combination effectively increases predictive policing efficiency and overall community safety.

Journals

Crime Mapping & Crime Prevention
By Mark Beaudry
Security Management 44 (5): 100-112. (2000)

This article discusses both basic and applied research in analytical crime mapping. It further details a plethora of tools used by today's law enforcement and research communities. Some of these resources include STAC, a toolbox of spatial analysis statistics which support law enforcement decisions by quickly summarizing point data. This text is useful to my research as a means of a subject matter in crime mapping and is a reference at how crime data is interpreted and represented.

Crime Mapping
By Oliver Ribaux
Forensic Science International 136: 10-16. (2003)

A section from the Forensic Science International Journal, this text details crime mapping through the eyes of forensic scientists and shows how they utilize and interpret their own set of data about crime occurrences. It further delves into the relation of spatial maps and perpetrator maps that show where offenders live, work and the known path traveled leading up to and after committing a crime. This is useful to my research in that shows how a particular specialization of the police force utilizes crime mapping and depicts specific imagery within crime maps.

Predictive Policing and Reasonable Suspicion
By Andrew Fergusun
Emory Law Journal 62.2: 259-325. (2013)

This text tells of the popular origin of crime mapping and specifically predictive policing from the LAPD's Real Time Analysis and Critical Response Division. It further shows how predictive policing works and how police use the data to take action. For instance, showing a police stake out of an area of predicted criminal activity. The text details notions of Fourth Amendment concepts like probable cause, reasonable suspicion, informant tips, drug courier profiles and high crime areas. This information is useful to my research to show how predictive policing is put to use and how officers synthesize crime map data in the field to patrol areas and prevent crime before it happens.

Books

**Predictive Policing : The Role of Crime Forecasting in
Law Enforcement Operations**
By Walter Perry
Santa Monica, CA, USA: RAND Corporation. (2013)

This book details predictive policing as an application of analytical technique and quantitative technique to identify targets for police intervention. It shows how to prevent crime or solve past crimes by making statistical predictions. The book also tells of the effectiveness of various crime prevention techniques like crime mapping and shows its strengths and weaknesses. This book is useful as a resource of showing what crime mapping is and how it is used but also pointing out its effectiveness and displaying strengths and weaknesses in the system of visual information.

Crime Analysis, Process, Data and Purpose
By Rachel Boba Santos
Los Angeles, CA, USA: Sage. (2013)

This book is a basic introduction to the field of crime analysis covers its history, as well as key concepts, data, and techniques. The text focuses on fundamental concepts and practical application as well providing illustrated examples. The book also details specific crime techniques with a section on crime mapping, showing how data is converted into map form and usage information. This is a helpful book from the subject matter standpoint of thesis and provides a clear and easy overview and introduction of crime analysis as well as some detailed insights into crime mapping.

GIS in Law Enforcement Implementation Issues and Case Studies
By Mark Leipnik and Donald P. Albert
London, England: Taylor and Francis. (2003)

This book details the use of GIS as well as the technology behind it to make it work. It further tells of insights into a suite of tools suited for crime mapping and analysis. This book also contains chapters on implementation, data sharing, web-based GIS and database design. This text is useful as a research reference that tells how specific law enforcement agencies are using GIS to solve crimes, deploy resources, and gauge the effectiveness of crime prevention.

Books

The Power of Visual Storytelling
By Jason Lankow
Hoboken, NJ, USA: John Wiley & Sons. (2012)

This book focuses mainly on the implementation of infographics in improving communication. The book looks at infographics by showing their use in marketing as well as traditional application in reporting information. The book also shows some of the related purposes for infographic use in other fields. This book is a useful resource as an overview of infographics and how it improves the flow of information between the data and viewer.

Symbols: A Universal Language
By Joseph Piercy
London, England: Michael O'Mara Books Limited. (2013)

Symbols: A Universal Language is a book that looks at the story behind the world's most famous symbols. It shows the importance that has been attached to the simplest of ideas and features important symbols from religion, politics and popular culture. The text further highlights the roles symbols have played throughout history and how they have shaped our understanding of the world. This is an interesting book that is useful as a reference to see how simple shapes, ideas and compositions work to communicate unique messages. It is also useful as a resource into communicating without any use of text.

Decoding Design: Understanding and Using Symbols in Visual Communication to discover the hidden meanings inside common logos and designs.
By Maggie Macnab
Cincinnati, OH, USA: HOW Books. (2008)

This book reveals how common symbols and shapes such as circles, squares and triangles lend themselves to bring on a greater meaning to a design. The text deconstructs famous logos and other sample designs to show how to communicate complex information quickly and intuitively with universal patterns. This book further details how other disciplines, such as philosophy, math, and physics, influence great design and help show ideas in a holistic and compelling manner. This book is a helpful resource to my research and design by showing how simple geometric forms can influence and strengthen an overall design to communicate new and innovative ideas as well as a clear message.

Books

This means this, this means that: a user's guide to semiotics
By Sean Hall
London, England: King Publishing. (2007)

This book delves into the notion of semiotics and sign theory. The text uses visual examples explain and detail such theories and provides practical examples of how meaning is made in contemporary culture through the use of signs and symbols and the types of signals such devices communicate. This book is an essential resource for my thesis by depicting the thought process and theory behind the messages that symbols and signs display. By delving into the theories and seeing what types of signals symbols can convey, I can utilize that knowledge in my designs to make sure they show a clear and specific message.

1000 Icons, Symbols + Pictograms: Visual Communications for Every Language
By Blackcoffee Designs
Gloucester, MA. USA: Rockport. (2006)

This book depicts 1000 different designs for symbols and pictograms from numerous countries around the world. This text is mainly useful as inspiration of different types of designs and styles.

Symbols, Signs & Signets
By Ernst Lehner
New York, NY, USA: Dover Publications. (1950)

This book showcases 1355 signs, seals, and symbols from around the world showing drawings, heraldic devices of the Middle Ages, to modern cattle brands and hobo sign language. This book is divided into 13 sections showing the designs and styles of different cultures and subjects including Symbolic Gods and Deities, astronomy, astrology, alchemy, magic, and mysticism. It also includes religious symbols, heraldry, monsters and imaginary figures; Japanese crests, marks and signets. This is another useful resource of inspiration and stylistic approaches to symbolism and iconic communication for my research.

Give Me a Sign!: What Pictograms Tell Us Without Words
By Tiphaine Samoyault
New York, NY, USA: Viking. (1997)

This text showcases many colorful signs from all over the world along with interesting information about the history and use of signs in everyday life. It also tells of some sign theory and how pictograms communicate the message without words. This text is useful to my research as a resource of inspiration and insight into sign theory and specific meanings behind pictograms.

Survey of Literature

Websites

"NIJ Home Page NIJ Home." National Institute of Justice.
http://www.nij.gov/Pages/welcome.aspx

The National Institute of Justice is the research and evaluation agency of the United States Department of Justice. This site is helpful to my research providing insights to many theories and crime prevention techniques as a comprehensive resource of the criminal justice system.

"Center for Problem-Oriented Policing." Center for Problem-Oriented Policing.
http://www.popcenter.org/problems/

The POP Center site encompasses a number of guides about how police can reduce the harm caused by specific crime and disorder problems. Each guide is informed by a review of the research literature and police practice, and peer-reviewed by a police officer, a police executive and a researcher. This site is a great resource for my research about crime mapping and gives insight into how crimes are classified into categories utilizing police officer and law experiences.

"Crime Mapping, Crime Analysis, & Problem Analysis." Police Foundation.
http://www.policefoundation.org/content/crime-mapping-crime-analysis

This site depicts many resources and case studies specifically tailored to crime mapping and predictive policing techniques. It also shows examples of problem analysis and crime analysis as well. It is a good reference about crime mapping utilizing case studies in different cities and show how police officers use the data in the filed.

"Law Enforcement." ESRI GIS.
http://www.esri.com/industries/public-safety/law-enforcement

The ESRI ArcGis site section on law enforcement shows numerous crime mapping applications as well as examples, tutorials and insight into how the software works. It is a good reference to see possible applications of crime mapping and to get an idea of how the software works and is used.

Predictive Policing

In addition to understanding the methodology and process of the design aspect, this thesis requires an in depth background and understanding of criminal justice topics involving crime mapping and predictive policing. In order to accomplish these base understandings of the aforementioned topics and gain an appropriate level of knowledge, an extensive survey and review of literature was conducted and completed.

So just what is predictive policing? Quite simply, it is the usage of analytical, typically quantitative techniques, to identify and target areas, buildings or offenders that need police intervention.[1] Furthermore, this notion allows police to both prevent crime and predict when and where it may occur based on temporal and spatial relationships seen in crime mapping solutions. By being able to anticipate human behavior and interaction, police can prevent criminal activities by repeat offenders and also repeat victims. This coupled with the use of crime maps allow for a proactive strategic formulation of tactics to be implemented based on limited or finite resources. The predictability of crimes is supported by the facts that criminals tend to operate within a comfort zone and have themselves a designated area where they conduct their criminal activity.[2] This idea is backed by the notions of routine activity theory, rational choice theory and crime pattern theory.[3] From these theories we can justify predictive policing by the principles that:

- Criminals and victims tend to follow the same life patterns and choices which can create an overlapping nature where crime may result.[4]
- Geographic, spatial and temporal relationships within the overlapping nature influence where, when and possibly how a crime may occur.
- When such factors and individuals become more intricately connected through patterns, a criminal will then make a rational decision on whether or not to commit a crime based on area, space, time and likelihood of getting caught by the police.[5]

[1]Perry, Walter L., et al. 2013. "Predictive Policing : The Role of Crime Forecasting in Law Enforcement Operations". CA, RAND Corp. 893-1333.
[2] Ibid
[3] Ibid
[4] Ibid
[5] Ibid

Temporal Issues

Much of crime mapping is based on a regression model taking into consideration multiple factors like spatial, demographics, etc. but the most prominent connection and issue I have found within my research is that of the temporal. Much of the hot spot mapping done is by heuristic means as police often know their city and geographic implications well which shows that point mapping is the best approach versus statistical mapping. Point maps delve into a specific detail about crimes and allow for a uniform degree of symbols.

This is opposed to the graduated symbol methods utilized in statistical maps where symbols vary in size and change based on the amount of quantitative data which can result in a mess of overlapping graphics which hinder the usage of the mapping solution entirely. The temporal factor of time relationships is an underlying and prominent theme that I have found in my research as efforts to interpret hot spots of criminal activity and make predictions are broadly based and non specific. Analysts tend to survey time on a basis of weeks or even months which leaves the present situation lacking in information for officers in the field. The specifics can lend a greater importance to officers on a daily basis to predict crimes and know what to look for which in turn can help keep them safer and citizens safer. For these reasons I have decided to incorporate time as an overarching element for my symbols to allow individual points(symbols) on a map to provide more information onto themselves than just depicting an incident within a certain spatial area.

Spatiotemporal analysis is a means of relating the time of incidents to that of the physical environment.[1] Because the patterns of crime occurrences can change with time and geographic factors it is important to take into account a relative time when crimes happen but also a time of day cycle meaning day AM/ night PM. By relating this information to time patterns, this allows a deep level of specificity and another element of quantitative data to be exemplified by my symbol system. Thus this also begs the design to work with the mechanics of a clock in form and function. An outer ring divided into quarters will give officers a minimum relative three hour window to determine time patterns on a daily basis. This coupled with a method of showing an AM/PM cycle will give a specific degree of accuracy that is dynamically expansive and work to increase the predictability of criminal occurrences in crime mapping. These factors combined create a potent tool for analyzing short or long term problems especially, for instance, with serial offenders who tend to commit crimes at a certain time of day, certain day of the week and even with a specific set of hours. This may determine a pattern and show a correlation, for instance, between a bank robbery and time of day so that police can thwart an offender.

[1]Perry, Walter L., et al. 2013. "Predictive Policing : The Role of Crime Forecasting in Law Enforcement Operations". CA, RAND Corp. 893-1333.

Research

Current Categories

As a result of my efforts in surveying the types of crimes that occur and specific existing symbols I have determined a listing of what I found to be the most widely used and designed mapping symbols. These symbols encompass criminal activity with some field activity attempts mixed in and include:

- Arson
- Burglary
- Homicide
- Rape
- Theft
- Vehicle Break In
- Weapons
- DUI
- Hazardous Materials
- Substance Abuse
- Fraud
- Domestic Offense
- Person Missing

- Assault
- Disorderly Conduct
- Narcotics
- Robbery
- Vandalism
- Vehicle Theft
- Accidents
- Gambling
- Misdemeanors
- Forgery
- Vagrancy
- Suicide
- Person Found

Symbol Selection

Based on these categories and other issues involving police activity such as the expanse of search and rescue efforts, emergency response and police field work, I devised my own selected abstraction of categories that best represents each of the four categories. For this thesis my series of symbols including the following:

- Arson
- Burglary
- Homicide
- Narcotics
- Aggravated Assault
- Shoplifting
- Speeding stop
- Warrant Served
- DNA Recovery

- Arrest
- Shoeprint
- Abandoned Vehicle
- Hazardous Materials
- Suicide
- Fire
- Mentally Ill
- Car Accident
- 911 Call

- Missing Person
- Person Located
- Trail Lost
- Trail Found
- Amber Alert
- Call Heard
- Clue Found

Rationale

The categories chosen as representation for my four categories of activity for this thesis were partially based on the previously mentioned popular crime categories but also take into consideration many areas that have not been explored for crime mapping. By using latch theory, I have grouped specific symbols into one of the four categories based on their relation to each other as a category as well as cross category influence. Problem oriented policing demands specifics over generalities which I have found to be the case in the symbols already in existence for police officers. Many times a police department will sometimes mount a crackdown on a certain crime such as assault, but this category is too broad for problem oriented policing strategies to be effective on its own. Therefore, it is better to determine a specific subset of a crime category which I have done in choosing aggravated assault which is more common as opposed to an instance of assault with a deadly weapon.

Furthermore, some of my choices influence others and help to support each other as a design system but also as an overlapping factor in crime patterns that can foreshadow events to come. For instance, shoplifting is a crime that I have added which is quite common but remains absent from crime mapping strategies. This can be an important category as it is influential to a more serious burglary or even be connected to the narcotics category in relation to supporting a drug addiction with shoplifting items for trade or sale. Moreover, the field activity, emergency and search and rescue sections have been widely expanded and also work well as a set.

Search and rescue for example works both systematically and visually to create a unified series that can stem from either the Amber Alert or Missing Person category depending if the person is a child or adult, but the remaining elements including trail information, clues and calls heard are all supportive to the prior. The emergency section includes multiple choices that again are related to each other as a whole but also interrelate to other categories as well. For instance, mentally ill people account for 5 percent of the US population.[1] An estimated 7 percent of police involvements in jurisdictions with 100,000 or more people involved the mentally ill.[2] The New York City Police Department, for example, responds to about 150,000 calls per year involving mentally ill persons.[3] This issue can directly impact another category I have chosen in suicide, or even causing a car accident if getting behind the wheel.

Community Crime Mapping

[1]Cordner, Gary, 2006. "Center for Problem-Oriented Policing: People with Mental Illness". http://www.popcenter.org/problems/mental_illness/
[2] Ibid
[3] Ibid

Crime Locale

Furthermore, I wanted to encompass something that was completely absent based on my research by eluding to situations for crime to manifest. Police officers in the field need to be able to identify and document areas that are the beginnings of crime. This includes abandoned buildings, homeless encampments and abandoned vehicles which I have chosen the latter. Abandoned vehicles are especially problematic in that they can become centers for prostitution, used as drug drops, addicts, homeless and even be hangout areas for gang members.[1] Abandoned vehicles can attract children who are curious which could lead to abduction and many cars contain hazardous materials and fluids within them that release with decay.[2] So by carefully researching specific crimes and situations I have determined a cohesive and interconnected design system that work both aesthetically but also on a cognitive level strengthening the problem oriented policing approach.

Semiotics

Aside from my research on problem oriented policing and predictive policing involving crime mapping, it is also important to consider the nature of my symbols as a pictorial language. Through researching semiotics including C.S. Peirce's model theory of signs, seen in figure 1 below, I am better able to construct the pieces of what my symbols are made up of to better communicate the appropriate ideas to the audience. Peirce's triangle is split into three kinds, iconic, indexic and symbol signs according to whether the representation in question is a concept, an actual thing, or a matter of habit.[3]
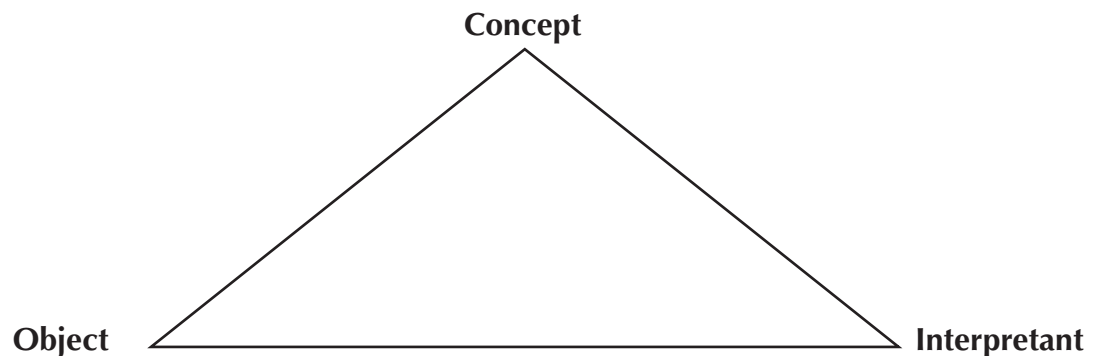
Concept

Object   **Interpretant**

Figure 1: C.S. Pierce Model Theory of Signs

One can think of the concept as the signifier, for example, smoke as a sign for fire. The object then is best thought of as whatever is being signified, for instance, the object to which a word attaches like fire signified by the smoke. The interpretant, seen in figure 1, is the most distinctive feature of Peirce's triangle as it is best thought of as the understanding we have of the sign/object relation. The importance of the interpretant is that the meaning of a sign is manifest in the interpretation that it generates in its users.[4]

[1] Maxfield, Mike, 2008. "Center for Problem-Oriented Policing: Abandoned Vehicles". http://www.popcenter.org/problems/abandoned_vehicles/
[2] Ibid
[3] Hall, Sean, 2007. "This Means this, This Means that: A User's Guide to semiotics ". King Publishing, London, England.
[4] Ibid

Semiotics Continued

So by understanding the relationships of each point of Peirce's triangle I am able to better classify the relationships created between a user and my symbols to infer the correct message being sent. The system of pictorial images created are by their nature iconic concepts as representational likenesses of the objects they depict such as people, vehicles but also as actions. A pictogram is a concept that relates the likeness of an object alone but when this is combined with an idea as describing an action or word, it becomes an ideogram and thus becomes the interpretant by linking that concept to the object.[1] Such icons do borrow notions from the symbol portion of the trichotomy in that such ideograms are linked symbolically to object by borrowing characteristics to strengthen the relation created by depicting an action through multiple pictogram elements.

Style

In trying to stylistically depict the previously mentioned array of symbols I researched primarily systems depicting actions with people to begin with. The first and one of the most prominent examples of which are the AIGA symbols as depicted here in figure 2:

Figure 2: AIGA Symbol System
http://www.aiga.org/symbol-signs/

These were a great place to start in regards to seeing how people are commonly depicted and even how some simple travel objects and ideas could be represented. Though a helpful start a turned my attention to the various Olympic icon sets which represent the categories of events for the games. More specifically I focused on the efforts of Katsumi Masaru for the 1964 Tokyo Games and Otl Aicher for the 1972 Munich games.

Community Crime Mapping   [1] Hall, Sean, 2007. "This Means this, This Means that: A User's Guide to semiotics ". King Publishing, London, England.

Style
Continued

Masaru and Aicher's depictions, seen in figures 3 and 4 below, representing people and actions are among the best in the games' history and the minimalist flat design works perfectly when trying to showcase a dynamic movement or flow.

Figure 3: Katsumi Masru's 1964 Symbol Set
http://olympic-museum.de/pictograms/picto1964.htm

Figure 4: Otl Aicher's 1972 Symbol Set
http://olympic-museum.de/pictograms/picto1972.htm

I ultimately decided to work with inspiration from these sets in my designs but mixed my elements with some portions of people and objects. I became influenced in constructivist designs with a flat, more geometric representation especially seen in my final designs containing people and hands. The minimalist flat nature of constructivism combined with an application for social impact design seemed to fit perfect with the systematic and utilitarian nature of the icons.

Design Process

Parameters   After concluding my research, I took some time to reflect on what I had explored and started to devise how I would develop the symbols and what they would look like as well as trying to work through the time telling mechanics. Initially, I had the notion of creating an entire set of 60 symbols but the scope, though ambitious, was too far reaching for the time alloted. I also wanted to make sure that I could give enough care and consideration to each symbol individually and make sure the system work well together. I therefore, paired my symbols down to 25 individual variations within four categories of crime, emergency, search and rescue and field data. With the exception of search and rescue which has seven symbols the remaining categories contain six symbols each. This seemed to be an appropriate amount of symbols to manage and represents a good breadth of possibilities. The system was meant to show a means of quantitative information with first thoughts trying to incorporate time based mechanics but also a quantity of a particular event that each symbol could represent. These symbols area meant to also be used on maps, so the smallest size for each must be readable on a large scale map primarily used on screen. The system should also be able to far reaching in terms of communicating a diverse amount of data. The entire system was to also be encapsulated within a 7 x 10" booklet that describes briefly the project, how the mechanics work and all of the final designed symbols and their variations.

Consider   There a some important considerations to be made about the design choices for this thesis. Firstly, the target audience, which for this project consists of primarily crime analysts and police officers but can stem to crime watch organizations and first responders. Because the symbol system is meant to be used foremost as a standardization component for law enforcement agencies there are the icons will be developed in black and white/grayscale so that their isn't an influence or conflict of interest in color choice or meaning as many departments tend to assign their own background colors to crime mapping symbols. Having a color system makes the sharing of information more difficult and confusing and thus creating confusion. So my system has no color variations which also help people who may be color blind if the need to interpret a symbol. The system is also stripped of text except only in the case of the 911 call symbol. Having a purely pictorial system creates a unified visual language in itself and helps to maintain a standardized system. The system must be easily readable when small on a map which is sure to have a good amount of visual noise. Size is one of the most important factors of the system and its adaptability by scalability is paramount. A round symbol not only relates to a clock but also helps to relate to point map systems which are already used as points are shown as circles.
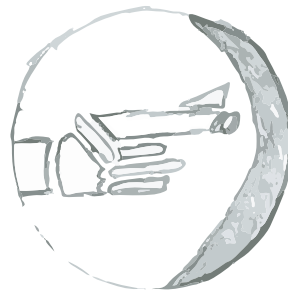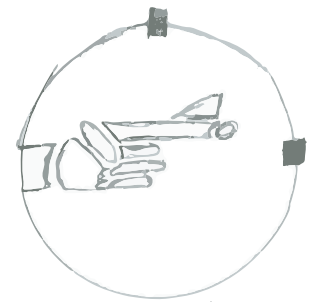
Design Process

Initial Sketches

My initial sketch ideas when thinking about my symbols revolved around the ideas of time mechanics and how to a depict a change in the AM/PM cycle as well as a time period. I first visited two main shapes of either circular or square forms. I tried to depict AM and PM by initially showing symbols with some shading and the inclusion of a crescent moon form to denote a change to night time. I started some thoughts about showing time with a clock type shape as seen below to the right side of the page. Further experimental considerations brought me to think of a system of combining two symbols together to create a new meaning, though interesting I didn't find it viable and scrapped the idea.
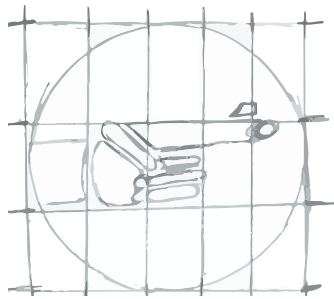
Initial Grid Layout

Moon/Night Idea

Initial Time Concept
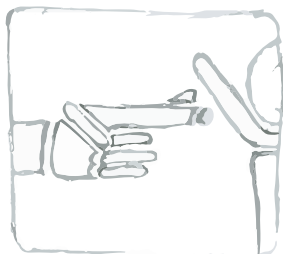
First Ideogram Attempt
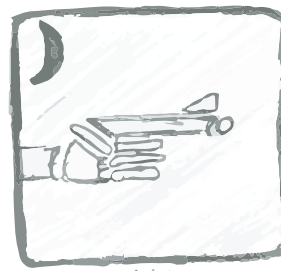
*Moon/Night Idea 2*
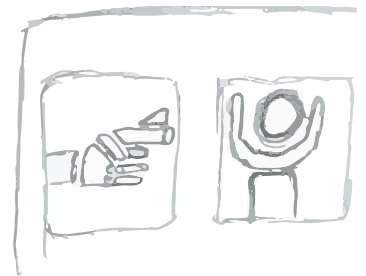
Experimental Side by Side Symbol Idea

Design Process

Initial Sketches

I then explored a variety of ideas for different symbol ideas on various topics some of which became portions of my final concepts while others were scrapped after this stage. However, it is important to explore a multitude of ideas to find an appropriate stylistic direction and ideogram solution that coveys the idea or action being represented. Many of my first ideas included designs incorporating people or portions of people such as hands which eventually carried over to my later and final symbols.

Design Process

*Arrest
Version 1.0*

To begin my transition over to computer sketches and developing my designs as my thesis progressed, I found it a good practice to focus on the design of one symbol ideogram to start. From there I could develop my illustrations further as well as working through the mechanics of the depicting quantitative data. I started with the arrest category to develop as a platform from which the rest of my symbols may manifest. As seen below my first thoughts of a symbol incorporated the night and day aspect as the only time indicator for the system while trying to also incorporate a method of indicating a percentage of the amount of the particular event in question happened.

My first illustrations for the arrest symbol included people as an exclusive element and are influenced by Otl Aicher's illustrations. Like Aicher's, my illustrations showcase a broken figure and explicit use of negative space to in this case complete the torso portion. This allows the upper body to not conflict with the pose of the arms and head which are essential to showing an action with appropriate body language. These particular symbols also have a series of gray bars that fill the background as an indication of the amount of arrests would have occurred.
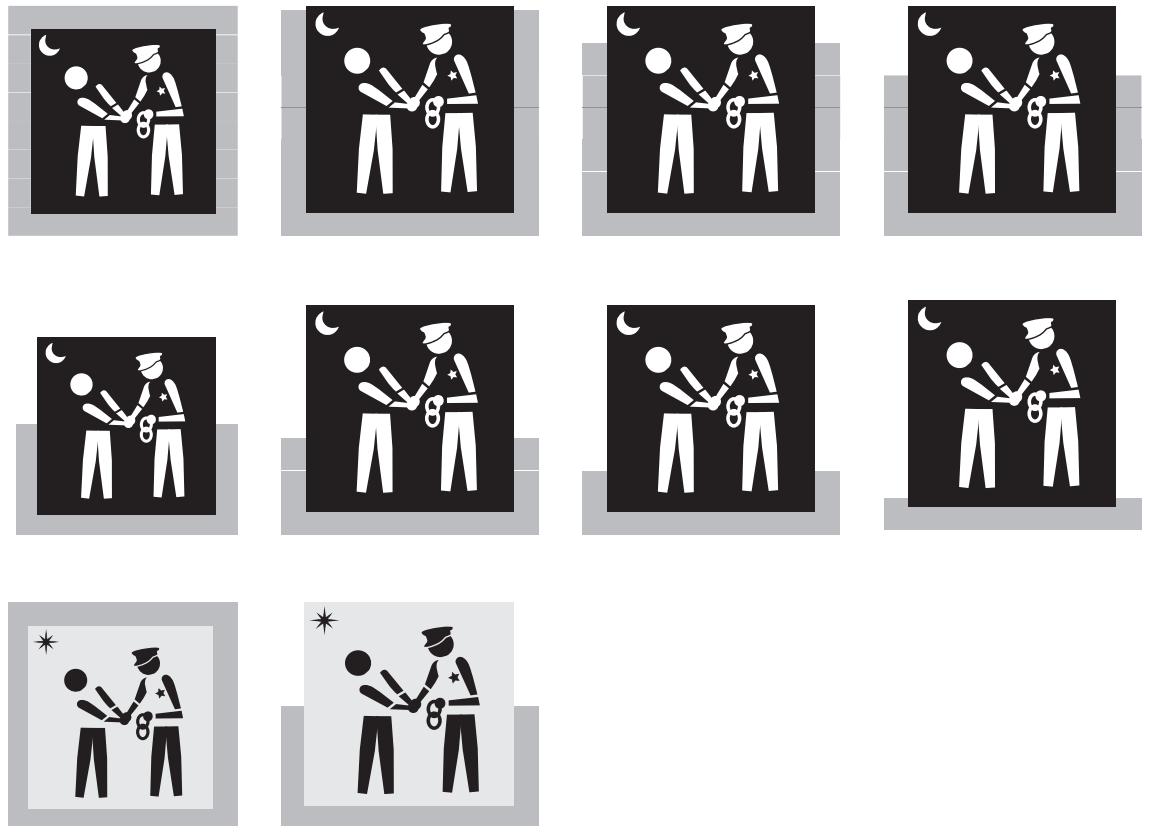
Design Process

*Arrest
Version 1.1*

As seen with the previous first attempt of creating a uniform platform for all the symbols to relate as well as an appropriate arrest icon, the below selection is a modification of the prior. These symbols elude to a semblance of day and night with the shift in grayscale contrast between the first six and the second five symbols. The mechanics of these symbols have an expanding circular element in the background that indicates arrest frequency based on the quantity of the data provided. These symbols also work within a square form as the previous grouping of first attempts.

Day Symbols

Night Symbols

Community Crime Mapping

Design Process

This collection of arrest symbol variations maintain the base illustration of the officer arresting a perpetrator but explore more abstract methods to indicate frequency of occurrences. They also show some more experimental methods of showing time of day with frequency in the same form within the background. Ultimately these symbols incorporated too much noise within the shape that detracted from the clarity of the main message indicating arrest with the foreground figures.
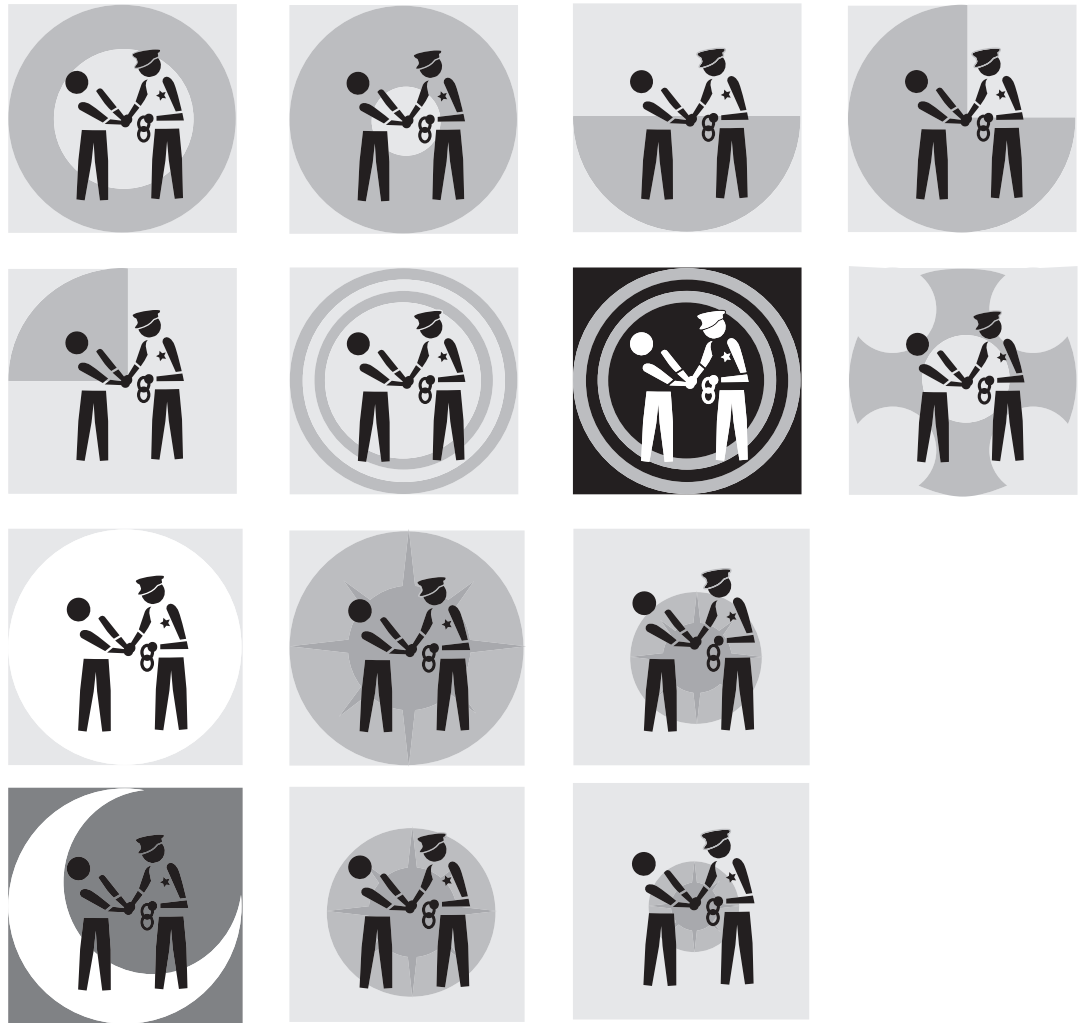
Abstract Mixture of Day/Night Symbols
showing a variance in depicting frequency.

Design Process

Arrest
Version 1.3

Though the collection of symbols shown below have a clear indication of the activity being communicated by the foreground figure illustrations they became nearly indistinguishable when small so that the identities of the figures are lost. I then realized that the target audience, being police, didn't need to have an officer represented in the symbol and rather focus on the action and perpetrator.

Design Process

*Arrest
Version 2.0*

Taking reference from prior arrest symbols of series 1.0 earlier in this document, this version 2.0 carries over the six horizontal background bars that denote a measure of frequency of arrests. Also as previously noted, I don't need to have an officer represented in the symbol and thus in this series version I rather focus on the action and perpetrator. I worked by also abstracting my prior illustration of human figures to be more rounded and geometric. I also wanted to make the view of the figure to appear closer to the viewer and thus worked toward an isometric top down perspective. This figure like my first versions also highlights the head, arms and hands by not giving the figure a filled torso but rather eluding to it through the use of negative space in between.
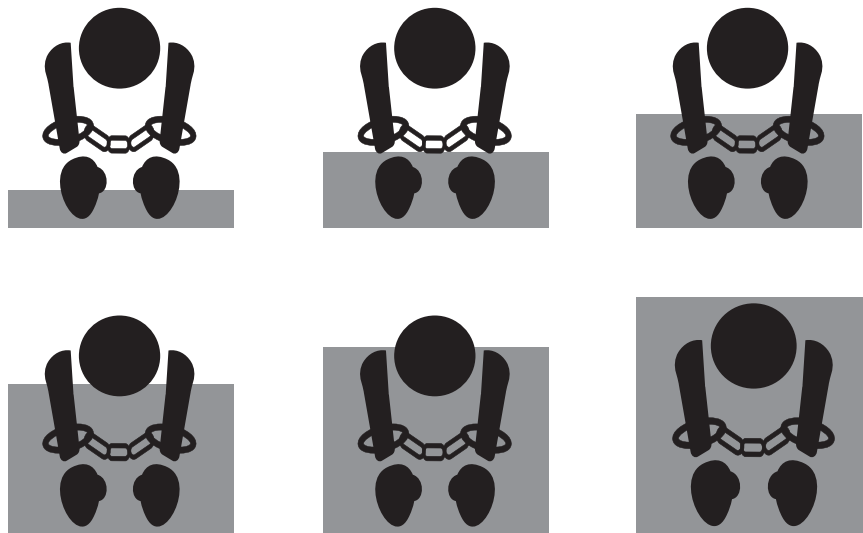
Arrest version 2.0 borrows elements from the prior series but showcases a new figure and isometric perspective.
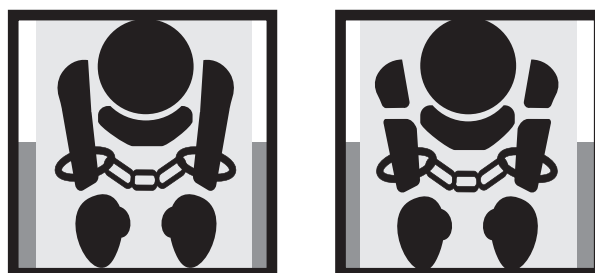
These symbols were experiments of the illustration style seen from Arrest version 2.0. They try to add a torso area and even denote shoulders on the right. However, these were found to become too cluttered and ultimately unreadable when small.
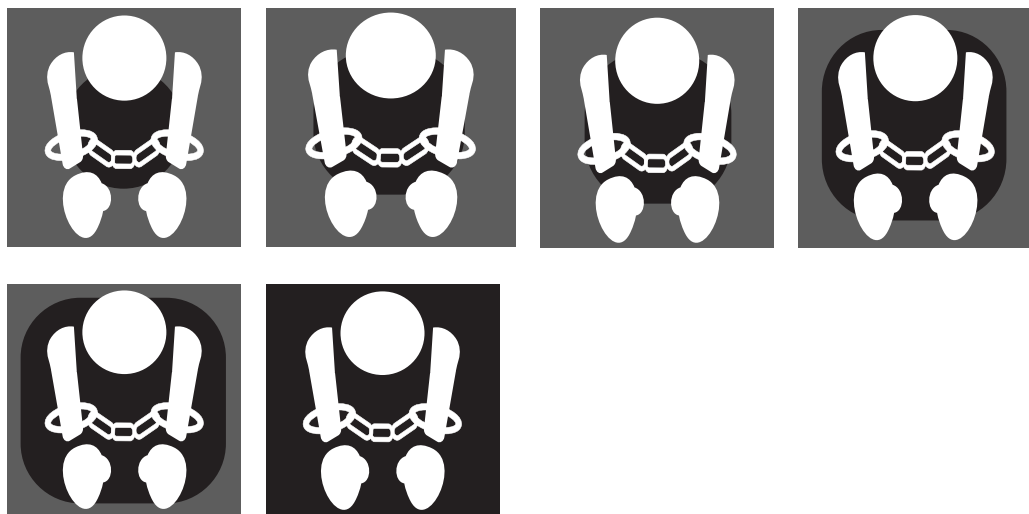
Design Process

Arrest Version 2.1

The following symbols below also take reference from prior arrest symbols in this document, by having an expanding circular element in the background that indicates arrest frequency based on the quantity of the data provided. These symbols also work within a square form as the previous grouping of attempts. However, these symbols use a foreground inverse of the figure of either black or white to denote day or night.
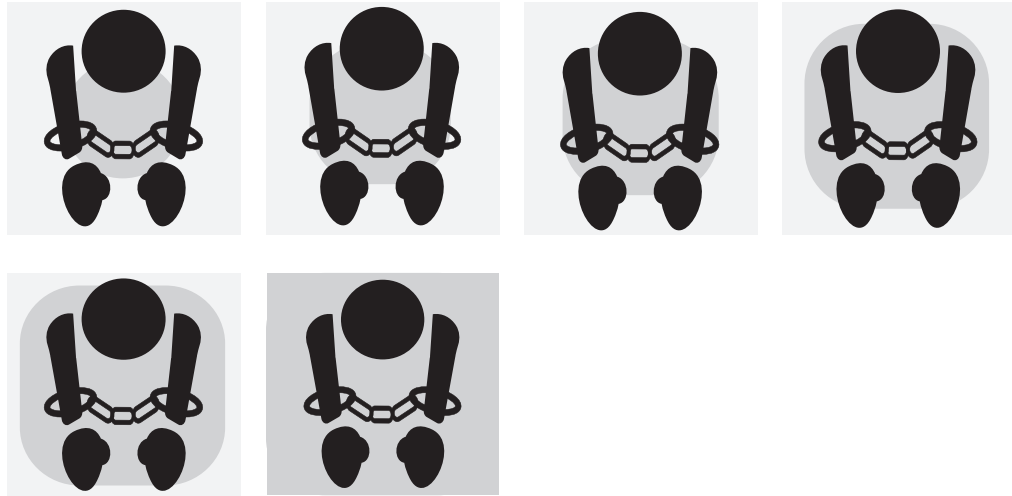

Arrest version 2.1 Day Symbols

Arrest version 2.1 Night Symbols

Design Process

*Arrest
Version 2.2*

As with series 1 of the arrest symbols, series 2 was found to be a little unclear when reproduced small due to the size of the figure in the foreground. The action represented by being arrested seemed to become lost in the first two series' with issues of balance and scaled being the main factors. I then thought about focusing more on the action itself and less on the depiction of the full figure in my next series of symbols.
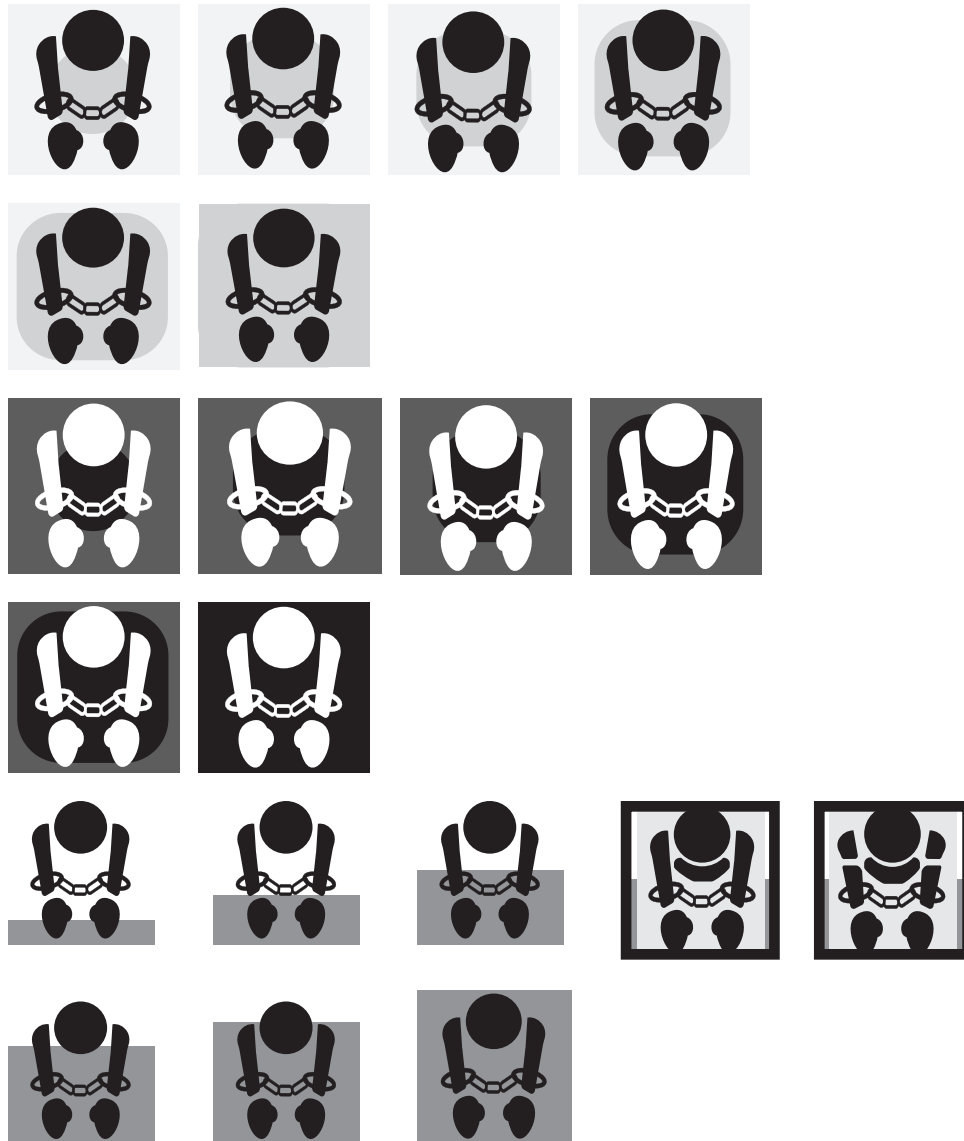
Arrest series 2 was also found to become somewhat unclear when reproduced at a smaller size.
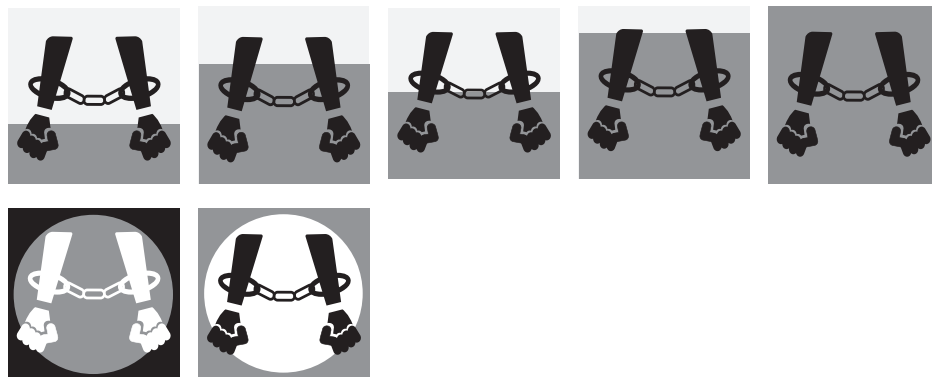
Design Process

In trying to focus more on the action and less on the complete figure for my designs I pared down the figure to depict the forearms and hands with cuffs around the wrists. I first used the arms from the figure in the previous series while still working with the same frequency and AM/PM mechanics as the previous two series had shown. I then tried a more realistic looking illustration for the hands with thinner arms which seemed to be more recognizable than the attempt in version 3.0. However, as with series 1 and 2, these symbols seemed like they could be more readable and showcase the message of arrest better. The mechanics would get in the way of readability in each of the three series' as is divided the background too much and conflicted for hierarchal importance with the foreground forms. Furthermore, the handcuffs, implied an unintentional connotation of chains and even a slavery aspect. I then decided to focus the mechanics more on time and time of day and scrapped the frequency aspect. I also decided to explore a better solution for the handcuffs as well as focus more on the hands only so that the forms could become larger in the space and thus more clear and concise.
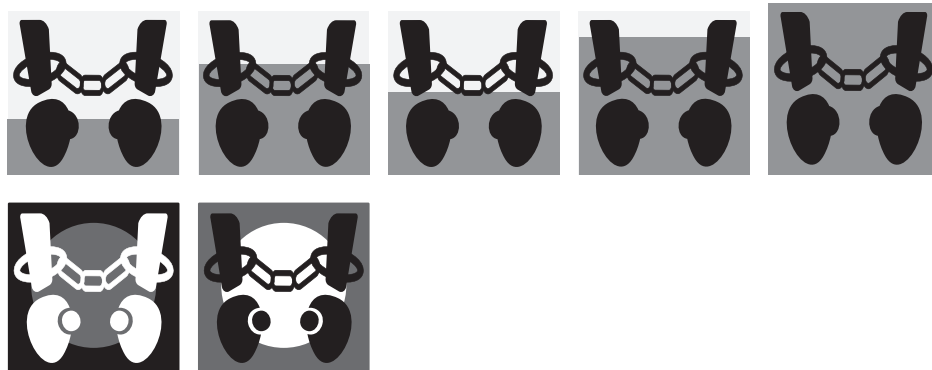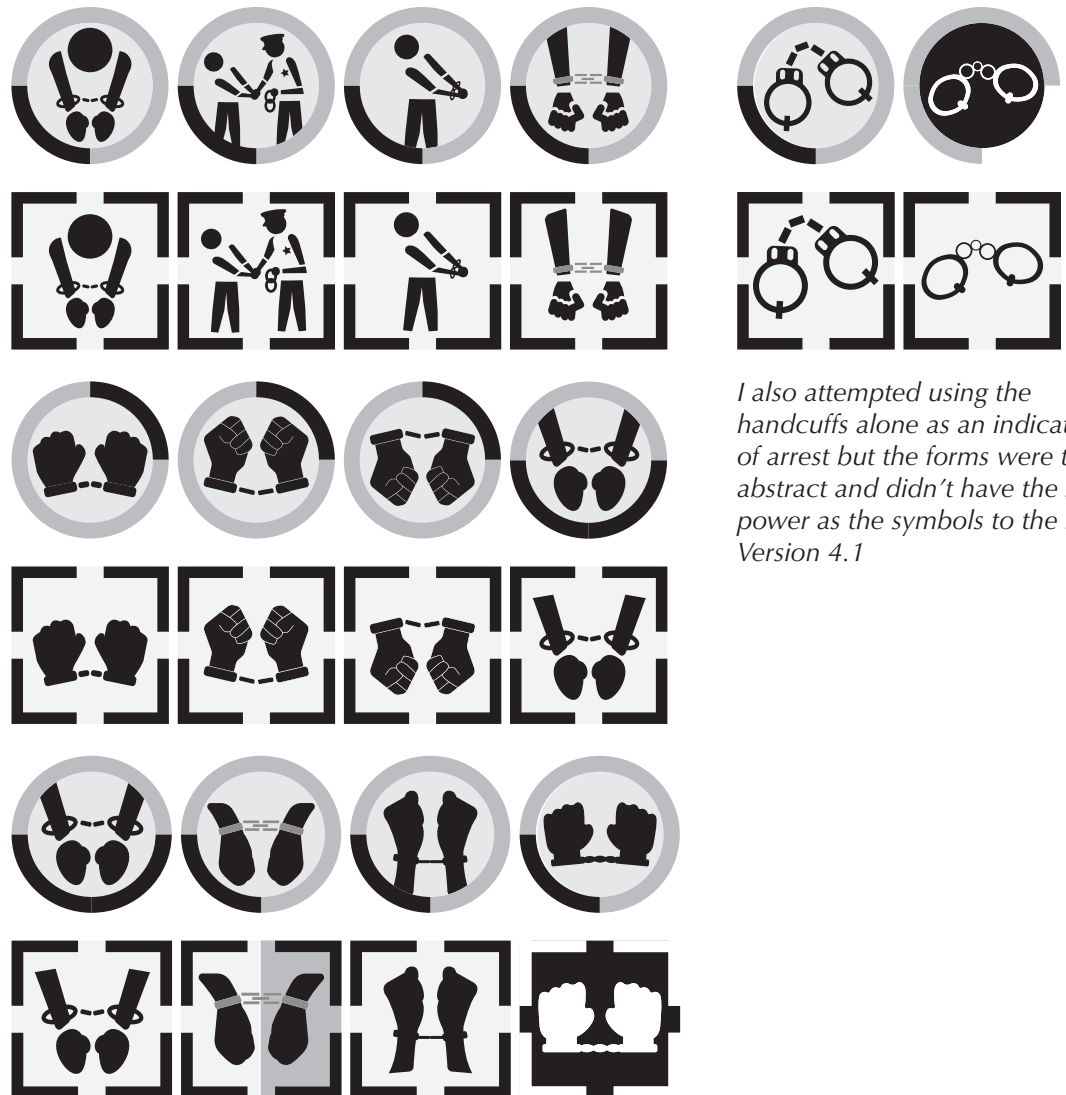
Arrest version 3.0

Arrest version 3.1

Arrest Version 4.0 and 4.1

I next developed multiple illustrations of hands and fists with handcuffs around them to try to see which design would be best. I also created each symbol to showcase a different style for the handcuffs as to move toward more realism and the correct connotation. Some of the illustrations included were also pieces from my first three series' of symbols with slight modification. Furthermore, I worked on focusing more about the time telling aspect solely and also the shape of the forms and developed two versions as a circle and square. I thought to divide the outer shape into four pieces and relate each to a time period of three hours. This would allow the inner shape to denote AM or PM and the outer to tell the time.

I also attempted using the handcuffs alone as an indicator of arrest but the forms were too abstract and didn't have the same power as the symbols to the left. Version 4.1

Various Arrest symbol illustrations and combination for series 4.

Design Process

Arrest Version 4.2

After reviewing each of the last series symbol illustrations of hands and numerous peer reviews, I decided that the upward pointing fist with the stroke to denote the fingers was the best solution. I then created multiple versions of the same illustration each with a different style handcuff and each with a different stroke weight to be able to choose the most legible weight for small sizes as well as the most appropriate and realistic version of handcuffs. The circular shape was chosen for its dynamism and direct relation to a clock face making time telling easier by following the same clockwise motion.

Arrest AM version 4.2 stroke weights and handcuff considerations.

Arrest PM version 4.2 stroke weights and handcuff considerations.

Design Process

*Arrest
Version 5
Final*

After reviewing each symbols of the last series I decided that the heaviest weight stroke was the best suited for the symbol. It allows enough contrast to easily read the fingers as the symbol reduces in size. The following handcuff illustration was also chosen as the best solution for its simple geometric forms and three link chain which is the most realistic and accurate with common forms of handcuff designs today. Thus these versions became the final Arrest symbol and are the basis of the makeup of the remaining 24 symbol solutions.

Arrest AM Version 5 final symbol.   *Arrest PM Version 5 final symbol.*

Design Process

*Narcotics
Version 1
and Final*

To continue with the crime section I then developed an illustration for narcotics. My first symbol design incorporated the syringe, drugs and spoon forms which are commonly associated with melting narcotics materials for use. I then modified the design to omit the spoon which was I deemed unnecessary to the overall message and rather increase the size of the drugs to make sure they are readable at a small size.

Narcotics AM Version 1 symbol.

Narcotics PM Version 1 symbol.

Narcotics AM Version 2 final symbol.

Narcotics PM Version 2 final symbol.

Design Process

Burglary Version 1 and Final

My first version of the burglary category of crime involved including the full figure breaking into a dwelling via the window. Though this encapsulated what constitutes a burglary well it didn't reproduce well small and became to muddled due to the varying strokes and small figure. I then reworked the design much as the arrest symbol by focusing on a piece of the figure in this case a hand holding a crowbar which is one of the most widely and commonly used entry tools. The redesign is much more readable and has more negative space for the eye to rest.

Burglary AM Version 1 symbol.

Burglary PM Version 1 symbol.

Burglary AM Version 2 final symbol.

Burglary PM Version 2 final symbol.

Design Process

Arson Version 1 and Final

Though the illustration itself didn't change much between the original and final versions of the arson symbol, the arrangement made the final more dynamic and cohesive. The original version includes a cloth in the spout of the gas can to symbolize a gas soaked item that would cause a fire. However, this was too intricate and unnecessary for the message or design and was omitted. The final version shows the can tipped upward as if someone is pouring gas to cause fire.

Arson AM Version 1 symbol.

Arson PM Version 1 symbol.

Arson AM Version 2 final symbol.

Arson PM Version 2 final symbol.

Design Process

*Homicide
Version 1
2 and Final*

My original homicide symbol encompassed a sprawled person with blood seeping from the body in a top down isometric perspective. This was modified in the second version to a side view as the first pose felt off as if the figure was brutally mangled. The second symbol was also changed due to the floating feel of the figure which didn't seem grounded on a plane. The final symbol shows a simple resting pose that is skewed to indicate a person lying on the ground. It also utilizes a broken line to relate to the chalk outline sketches of a murder victim.

Homicide AM Version 1 symbol.

Homicide PM Version 1 symbol.

Homicide AM Version 2 symbol.

Homicide PM Version 2 symbol.

Homicide AM Version final symbol.

Homicide PM Version final symbol.

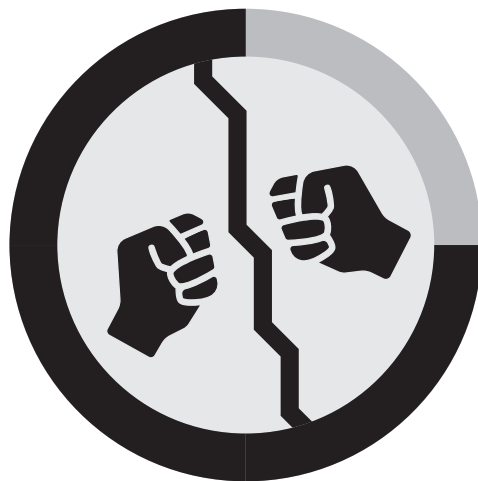# Design Process

Assault Version 1 and Final

The first version of the assault symbol involved two figures who appeared to be in a fight with each other. This design fell short in terms of properly communicating the appropriate message and seems more like one figure is pulling the other slightly. Aside from this, the two figures in the space were too close and and confined so the result was a muddled symbol. The redesign final version uses the two fists seen in my arrest symbol to indicate a fight between two parties with a break in between. This design was much more effective and reproduced much better small. It also gives a greater affinity to the entire set by sharing elements between symbols in various categories.

Assault AM Version 1 symbol.

Assault PM Version 1 symbol.

Assault AM Version 2 final symbol.

Assault PM Version 2 final symbol.

Design Process

*Shoplifiting
Version 1
and Final*

The shoplifiting symbol only changed slightly between the first and final versions. The original had a shopping bag being held by the fist see from the arrest symbol along with a partial indication of the handcuffs to show a criminal act. This was deemed unnecessary and extraneous for the message and was omitted for the final version. The shopping bag was also shortened to give greater emphasis on the stealing the bag and to make sure it holds at small sizes.

Shoplifiting AM Version 1 symbol.

Shoplifiting PM Version 1 symbol.

Shoplifiting AM Version 2 final symbol.

Shoplifiting PM Version 2 final symbol.

Design Process

Speeding Version 1 and Final

Within the field activity category, the speeding symbol is meant to directly relate to a speedometer in a car. This symbol is used for speeding stops by police officers on patrol. The first and final versions of this symbol are relatively the same except the final version has a heavier stroke on the inside hash marks and also changes the marks in the PM version all to white for better visibility overall.

Speeding AM Version 1 symbol.

Speeding PM Version 1 symbol.

Speeding AM Version 2 final symbol.

Speeding PM Version 2 final symbol.

Design Process

Warrant Version 1 2 and Final

The warrant symbol category involved three iterations in the design as a whole. The first attempt was meant to depict the writing of a search warrant but this didn't contain the essence of the action of serving a warrant. The next iteration utilized an illustration of a person seen partially in the homicide symbol. This involved a person handing a warrant but felt more like it was being thrown. So I decided to keep the person in the background still handing the warrant but increasing the paper size to indicate this is an important document being handed over to the party being served.

Warrant AM Version 1 symbol.

Warrant PM Version 1 symbol.

Warrant AM Version 2 symbol.

Warrant PM Version 2 symbol.

Warrant AM Version final symbol.

Warrant PM Version final symbol.

Design Process

The symbol for finding a shoeprint as part of police field work is unlike many of my symbols in that it did not change from the initial version. It is a simple abstraction of the print from a shoe sole that is quite geometric in nature of the parts that make up the whole. It is also effective at multiple sizes.

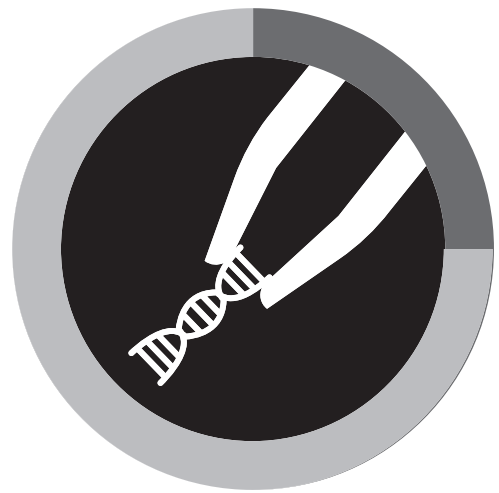*Shoeprint AM Version 1 symbol.*

Shoeprint PM Version 1 symbol.

Design Process

The DNA recovery symbol is yet another addition to the field work set and also has little change made between the first and final versions. The initial version includes a DNA strand held by tweezers indicating its collection. This was seen as unnecessary and omitted in the final version to only include a large DNA strand. This greatly improved the readability of the symbol while also giving more emphasis to the DNA rather than one of the tools used to collect it.

DNA Recovery AM Version 1 symbol.

DNA Recovery PM Version 1 symbol.

DNA Recovery AM Version 2 final symbol.

DNA Recovery PM Version 2 final symbol.

Design Process

Abandoned Vehicle Final

Like the shoeprint symbol, the abandoned vehicle symbol did not change from the initial version. The illustration is a simple detail of a side view of a car with a popped hood and wheels on blocks. It is also effective at multiple sizes.

Abandoned Vehicle AM Version 1 symbol.
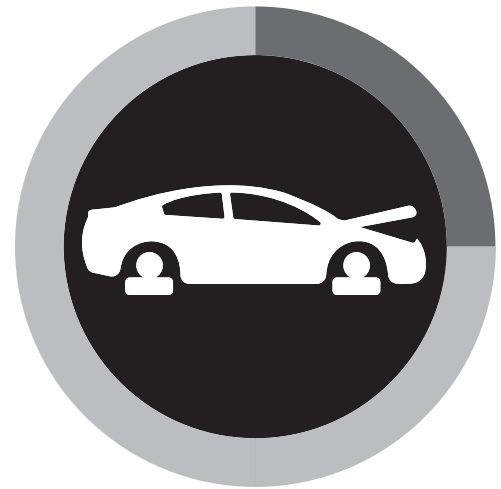
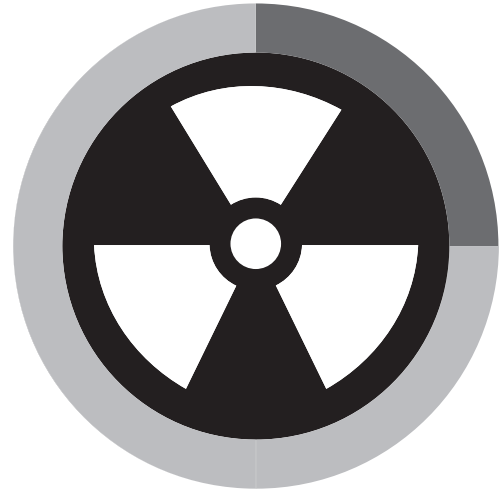*Abandoned Vehicle PM Version 1 symbol.*

Design Process

Hazardous Materials Final

The hazardous materials symbol like the shoeprint symbol and abandoned vehicle symbol did not change from the initial version. This symbol, from the emergency set, uses a simple triangular illustration relating to a radioactive symbol. It is a simple detail that is also effective at multiple sizes.


Hazardous Materials AM Version 1 symbol.   *Hazardous Materials PM Version 1 symbol.*
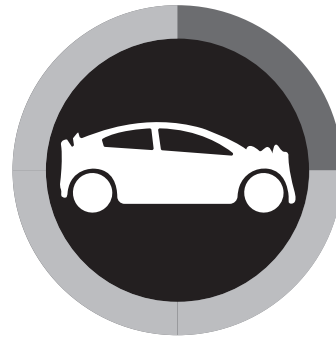
Design Process

Accident
Version 1
2 and Final

The car accident symbol is part of the emergency set of symbols for police first response. This symbol went through three iterations to the final design. The first version showed a crumple car in the front and back from the side view. However the destruction is hard to make out when small. After an iteration the second design shows the car overturned and on fire while also having a crumpled front end. This looked more like a mistake than not and thus a final version was created taking the elements from version two but omitting the destruction which makes for a more clear and cohesive design and also more readable symbol.
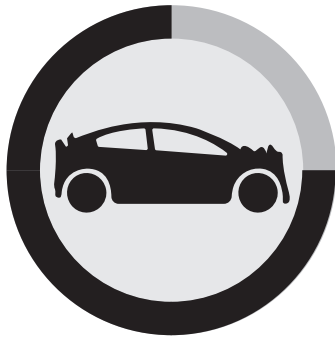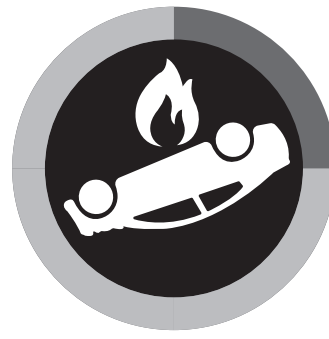
Accident AM Version 1 symbol.

Accident PM Version 1 symbol.

Accident AM Version 2 symbol.

Accident PM Version 2 symbol.

Accident AM Version final symbol.

Accident PM Version final symbol.

Design Process

The 911 call symbol is the only one to incorporate any form of text or numerals. This symbol went through three iteration through to the final version by trying to get the call/sound waves the correct curve angles. The first and second versions felt too flat and not organic enough to depict an emanating pulse. Finally the final version followed a greater arc and also fits better within the circular shape of the symbol to act more dynamic and legible.

911 Call AM Version 1 symbol.

911 Call PM Version 1 symbol.

911 Call AM Version 2 symbol.

911 Call PM Version 2 symbol.

911 Call AM Version final symbol.

911 Call PM Version final symbol.

Design Process

Fire Final   The fire symbol like others did not change from the initial version. This symbol, from the is seen throughout the complete system in various elements of other symbols to make the system stronger as a sharing element. This symbol utilizes a doubled illustration as one flame smaller than the other to create a more dynamic shape that incorporates more negative space within the shape.

Fire AM Version 1 symbol.   *Fire PM Version 1 symbol.*

Design Process

Suicide
Version 1
and Final

The suicide symbol as part of the emergency set included to iterations of the design to spawn a final version. The first version depicted a person hanging from a noose, a common way of committing suicide. However, this made the symbol too crowded to be easily legible and also contained an unnecessary element in the figure itself as too graphic. The revision shows a large noose only and is much improved in clarity.

Suicide AM Version 1 symbol.   *Suicide PM Version 1 symbol.*

Suicide AM Version 2 final symbol.   *Suicide PM Version 2 final symbol.*

Design Process

Mentally Ill Final

The mentally ill symbol incorporates a brain that is damaged with a separation in a section of the piece. It is a simple billowy shape that does well to communicate a mentally unstable person. It also is easily legible at multiple sizes.

Mentally Ill AM Version 1 symbol.

Mentally Ill PM Version 1 symbol.

The missing person symbol went through three iterations to gain a proper result. The first version included the figure once more but was too small within the overall shape of the symbol and thus revised. The second version included just the head with question mark over it but the head wasn't realistic enough to be easily recognizable. Finally the final version has a reworked head with a back and indication of neck and chin it is much more recognizable overall and by including the question mark inside it allows the head to take up a greater space which is easily legible when small.

Missing Person AM Version 1 symbol.   *Missing Person PM Version 1 symbol.*

Missing Person AM Version 2 symbol.   *Missing Person PM Version 2 symbol.*

Missing Person AM Version final symbol.   *Missing Person PM Version final symbol.*

Design Process

Person
Located
Version 1
2 and Final

The person located symbol went through three iterations to gain a proper result just like the missing person category. it uses all the same element as the missing person symbol and in the same way except instead of a question mark it contains a common location symbol seen with gps systems.

Person Located AM Version 1 symbol.

Person Located PM Version 1 symbol.

Person Located AM Version 2 symbol.

Person Located PM Version 2 symbol.

Person Located AM Version final symbol.

Person Located PM Version final symbol.

Design Process

Call Heard
Version 1
2 and Final

Just like the missing person and person located symbols, call heard borrows the same elements except utilizes the sound wave illustration seen in the 911 call symbol. The first version depicts a person with a hand to their ear hearing the incoming sound waves. While effective in concept, the scaling becomes an issue. The second version depicts only the head hearing the sound but like the previous two symbol categories, the head wasn't realistic enough. The final version uses the updated head from the prior categories and also the final illustration of the sound wave from 911 call.
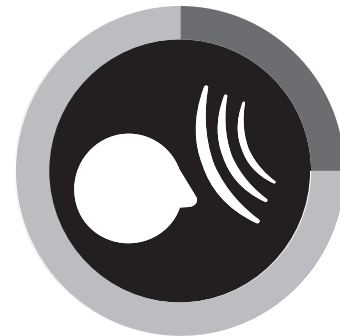
Call Heard AM Version 1 symbol.   *Call Heard PM Version 1 symbol.*

Call Heard AM Version 2 symbol.   *Call Heard PM Version 2 symbol.*

Call Heard AM Version final symbol.   *Call Heard PM Version final symbol.*

Design Process

Trail Lost Version 1 2 and Final

The trail lost category symbol went through three iterations as well as some of the other symbols. It uses the question mark from missing person to show that the trail is question has run cold. The first version showed foliage with the question mark overhead but the illustration felt too organic and more like jungle than forest. After a revision, the second version included multiple geometric trees but could still be simplified for more clarity and thus the final version contains only three trees with question mark.

Trail Lost AM Version 1 symbol.

Trail Lost PM Version 1 symbol.

Trail Lost AM Version 2 symbol.

Trail Lost PM Version 2 symbol.

Trail Lost AM Version final symbol.

Trail Lost PM Version final symbol.

Design Process

Trail Found
Version 1
2 and Final

The trail found symbol also went through three iterations as well as other symbols. It uses the gps location mark from person located to show that the trail is question has been found. The first version showed foliage with the locater overhead but the illustration felt too organic and more like jungle than forest. After a revision, the second version included multiple geometric trees but could still be simplified for more clarity and thus the final version contains only two trees with locater. To connect and make more similarity with trail lost, this symbol also has three foreground pieces except in place of one of the trees, this icon has a trail in an isometric perspective view.

Trail Found AM Version 1 symbol.   *Trail Found PM Version 1 symbol.*

Trail Found AM Version 2 symbol.   *Trail Found PM Version 2 symbol.*

Trail Found AM Version final symbol.   *Trail Found PM Version final symbol.*

Design Process

Amber Alert Version 1 and Final

The amber alert symbol first contained two figures in a struggle in the initial version where a larger adult figure was dragging a smaller child figure.
As with many others, while a good concept it was lacking in scalability and consistency. Therefore, the final version contains a small and large figure derived from earlier symbols like warrant. The scale relationship helps to read as adult child and the included question mark overhead indicates a semblance of being lost or taken.

Amber Alert AM Version 1 symbol.

Amber Alert PM Version 1 symbol.

Amber Alert AM Version 2 final symbol.

Amber Alert PM Version 2 final symbol.

Design Process

Clue
Found
Final

The clue found symbol is the final in the search and rescue set. It includes a magnifying glass with a question mark inside to symbolize that something unknown has been found or uncovered.

Clue Found AM Version 1 symbol.
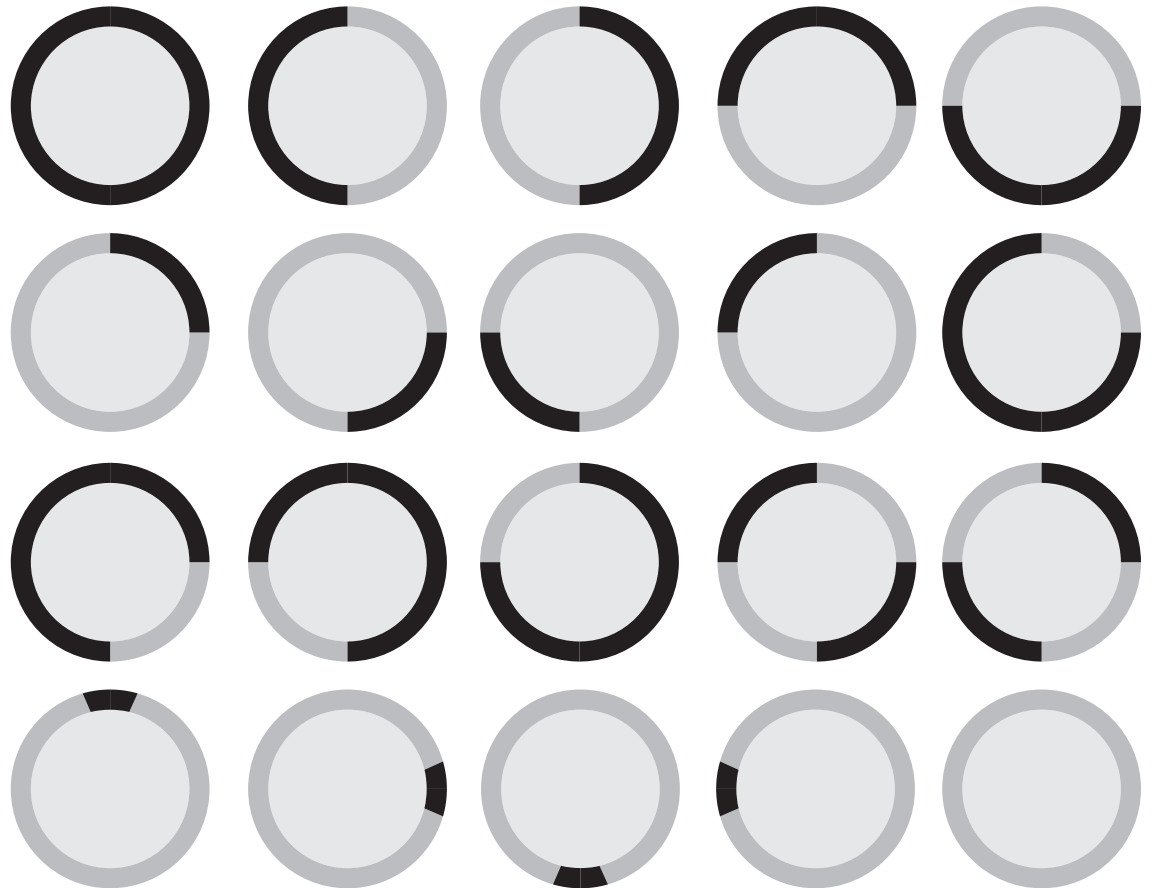
Clue Found PM Version 1 symbol.

Design Process

Time Changes

While also developing the illustrations and designs for each symbol category I also worked to create a complete time system that entails all of the possible combinations of time available per each twelve hour cycle in AM and PM.
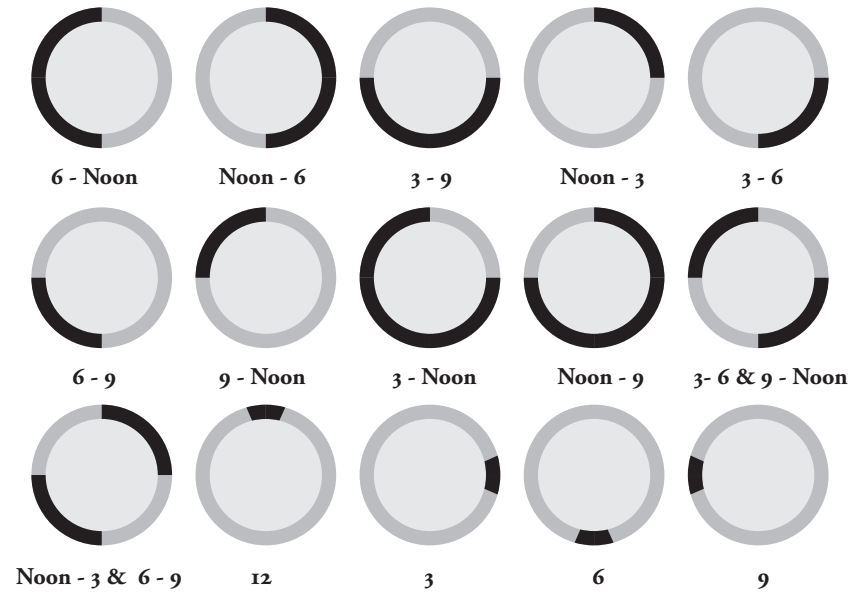
AM Time variations for full twelve hour period broken into 3 hour combinations.
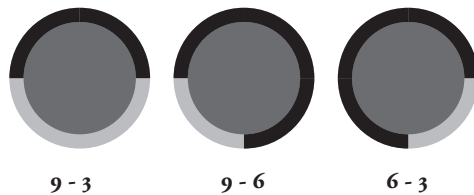
Time
Changes
Continued

I then further considered the system and found that there were a few time periods where the times transitioned from AM to PM. I then instituted a transitional symbol background being gray to denote an in between time moving from AM to PM or vice versa.

AM

6 - Noon	**Noon - 6**	**3 - 9**	**Noon - 3**	**3 - 6**
6 - 9	**9 - Noon**	**3 - Noon**	**Noon - 9**	**3- 6 & 9 - Noon**
Noon - 3 & 6 - 9	**12**	**3**	**6**	**9**

Transitional

9 - 3	**9 - 6**	**6 - 3**

PM

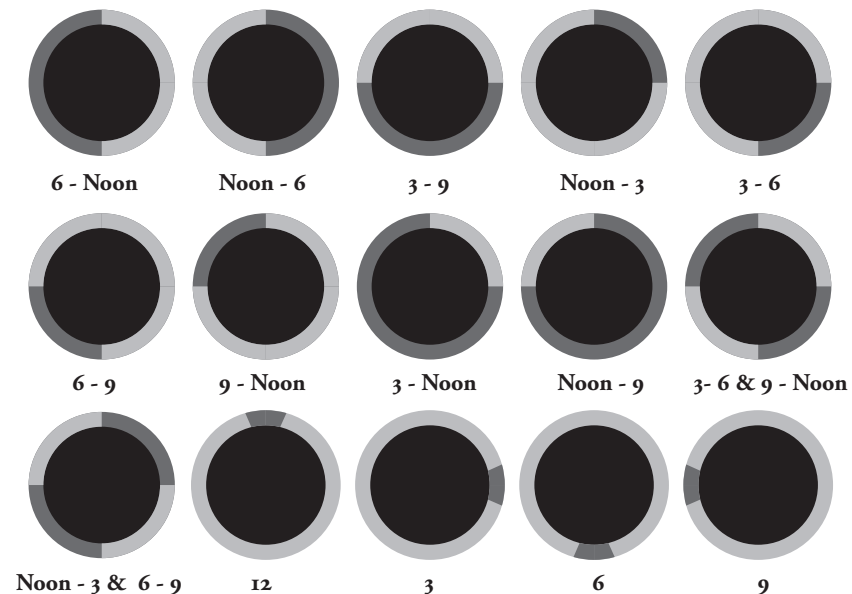|				
6 - Noon	**Noon - 6**	**3 - 9**	**Noon - 3**	**3 - 6**
6 - 9	**9 - Noon**	**3 - Noon**	**Noon - 9**	**3- 6 & 9 - Noon**
Noon - 3 & 6 - 9	**12**	**3**	**6**	**9**

Design Process

*Time
Function*

The Outer circle represents a relative time based on four, three hour time divisions equaling 12 hours in either AM or PM format. The **darker** sections of the ring indicate the time period and are read clockwise to relate to a clock in function and in aesthetics. Users start determining the time by reading the darkened area that comes first in a clockwise motion, always going forward.

AM

The inner circle shows the illustration as black on white for AM hours.
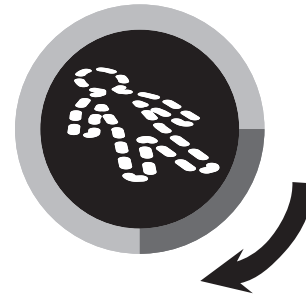

6AM - 12Noon

12Noon - 3AM & 6AM - 9AM

PM

The inner circle shows the illustration as white on black for PM hours.

3PM

3PM - 6PM

Transitional

The inner circle shows the illustration as white on gray for PM to AM transition and black on gray for AM to PM transition time.

9AM - 3PM
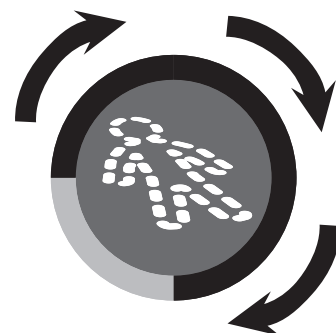
9PM - 6AM

Design Process

AM *Full Symbol Collection Final*

Below is the full AM symbol collection in its final version spanning the four categoreis and twenty five symbols. The second image depicts the symbols at their minimum size of 16 x 16px which would be actual scale when used on a point crime map. Scalability is one of the most important factors of mapping and of this collection.

Field Work

Crime

Emergency

Search and Rescue

Full AM Symbol Collection

AM Collection 16 x 16px Minimum Size.

Design Process

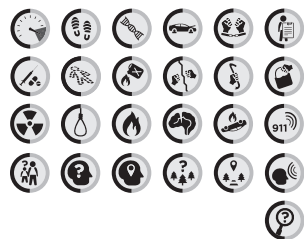PM *Full Symbol Collection Final*

Below is the full PM symbol collection in its final version spanning the four categoreis and twenty five symbols. The second image depicts the symbols at their minimum size of 16 x 16px which would be actual scale when used on a point crime map. Scalability is one of the most important factors of mapping and of this collection.

Field Work

Crime

Emergency

Search and Rescue

Full PM Symbol Collection

PM Collection 16 x 16px Minimum Size.

Print Booklet

Aside from developing the symbol collections which are the primary focus and design for this thesis, I also created a supplemental print booklet that includes all of the symbol sets, tells the background problem and solution and also gives some interesting facts particular to each symbol selection.

Front and Back Cover

Univers LT Std Black, Bold
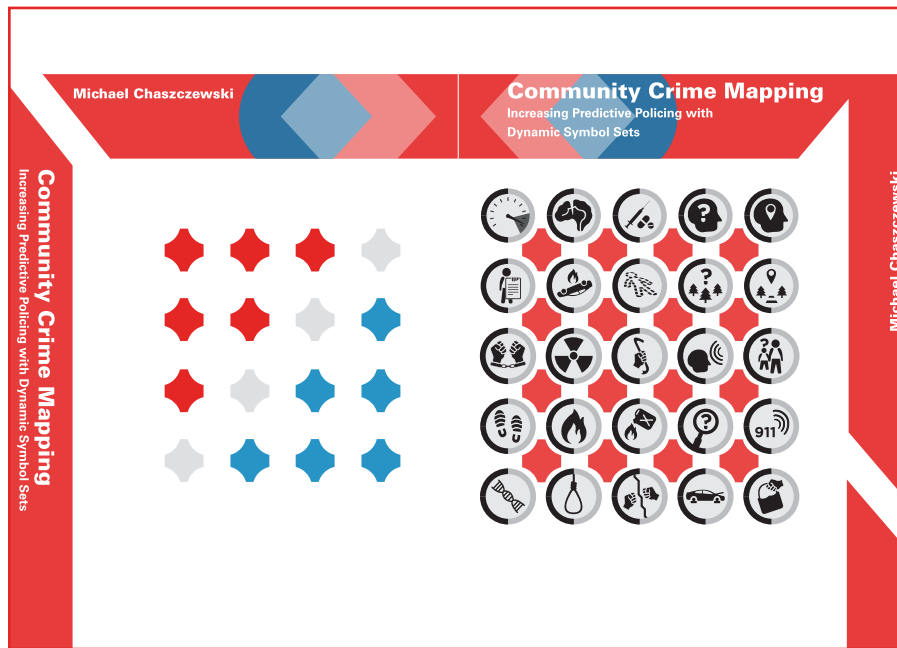
Title Page

Univers LT Std Black, Bold, Light

Design Process: Booklet

Print
Booklet

The booklet comprises of approximately 48 pages of content and details the background, problem and solution within the introduction followed by a section depicting the time telling mechanics of the symbol system and also the four categories of crime, field activity, emergency and search and rescue symbols.
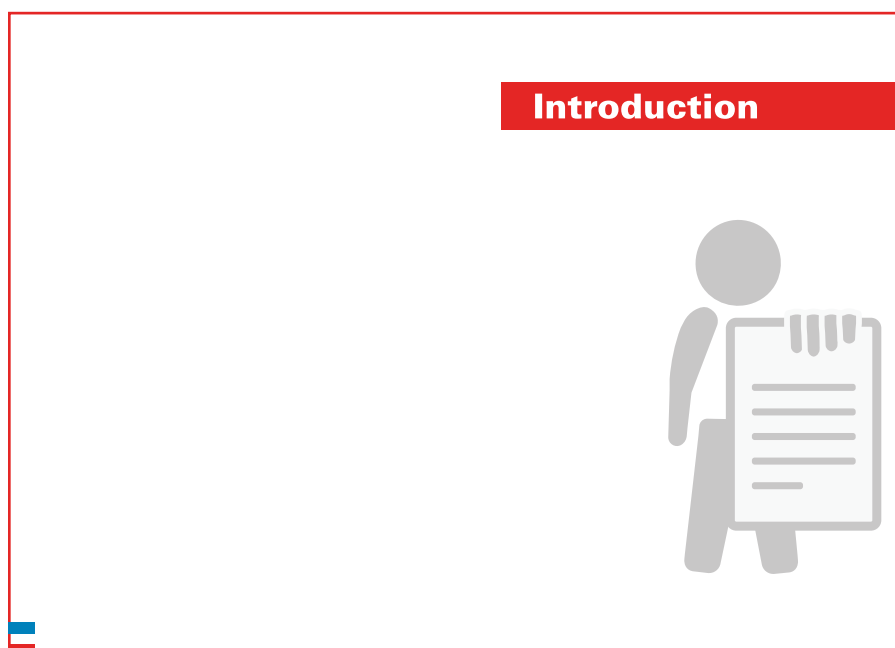
Table of
Contents

Univers LT
Std Black,
Bold, Light

Table of Contents

Section
Title Page

Univers LT
Std Black,

Each section
has an intro
title page
with image,
always on
right side
of the book.

Introduction

Print Booklet

Each of the inside pages incorporates a side title that indicates the page number as well as the title of the section. Each individual page has a title of the topic in red at the top followed by the relevant information for the particular section. Each new section title page is on the right side and also incorporates an illustration.

Background Problem,

Each inside page has Univers LT Std Black, Bold titles and Light body copy.

2

Introduction

Situation Analysis

Background Crime prevention is an important area of study in our society as it plays an integral role in the lives of citizens and the officers who protect them from harm. Law enforcement agencies such as local police enlist the aid of strategic counter crime plans to tackle the overbearing urgency that is created everyday when crimes are committed. Crime mapping is one of these tools allowing officers to understand criminalistic data and map out crime routes, hot zones and predict where the next crime may occur. Through mapping spatial relationships of crime perpetrators and victims, predictable policing efforts can be put into effect that cut crime rates and help to better serve the community by policing areas that need it most. This mapping technique is also important in future efforts to catch perpetrators and solve crimes.

3

Introduction

Mapping Issues

Problems Current crime mapping techniques are meant to allow for law officers to gain a more complete understanding about the criminal activity that occurs along their patrols and an over arching view of their scope of jurisdiction. Mapping criminal activity is typically done at an individual agency level by crime analysts that relay the information to officers in the field. However, each department handles the data differently and analysts develop a symbol system tailored to their own interests.

Alternatively, many maps are developed with base ESRI crime symbols which are then modified for a specific department. Furthermore, analysts tend to assign colors to each crime category and thus further distances the overall system from itself and from systems in other departments across the country. Ergo, the crime prevention measures that should be derived from crime mapping become confusing and an array of issues still persist which include:

- A lack of a cohesive unified visual symbol system.

- No standardized system of color for crime categories.

- Disconnect between officers and analysts who may each misinterpret data.

- Disconnect between departments who need to share crime mapping data.

- The breadth of symbols available is limited to only crime.

- Crime mapping doesn't include other important and regular police activity such as field work, search and rescue efforts, and emergency response.

- The current system does not attempt to indicate when an event occurs either AM or PM and also a relative time period of an event occurrence.

Solution Section Title Page

Univers LT Std Black

4

Introduction

Design Solution

Resolution A dynamic symbol solution system was developed to fill the gap in crime mapping by unifying the strategy with a series of standard icon system sets that span the breadth of law enforcement duties. It will increase the levels of communication by having changes to any given symbol based on time of day and a relative time period spanning three hour increments. To easily show this, the symbols are circular and directly relate to a clock in function.

The resulting symbols allow crime maps to encompass all activities that police are involved with creating a more diverse and data rich design solution. Furthermore, the system as a whole will allow for cross communication between departments to be easier and more effective. An order and concise visual interpretation has been created and the solution remains void of color in place of a grayscale to keep the system whole and uniform across each application. When applying this system to a layered interactive map(ESRI ArcGis), officers can now focus on specific efforts that involve certain crime categories without an over abundance of information to decipher.

Time

*Print
Booklet*

The time telling section explains how to tell the time at various times throughout the day as well as depicting all of the possible time combinations for the system. It also show the final AM and PM versions of all of the 25 symbols.
See the appendix for a complete version of this booklet.

*Time
Telling*

These pages detail how time telling works as well as all of the time variations.

*Symbols
Crime
Section
Title Page*

Univers LT
Std Black,

Evaluate   Proper evaluation of the thesis criteria and product should employ physical interactions between the product crime professionals, professors and citizens within the community. Because this symbol system must be recognized by people with varying backgrounds and the system can go beyond crime mapping to be used in civilian crime watch applications for public distribution, a diverse survey of information can be used for testing. The goal is not to make depictions that are ambiguous or specific to a certain visual vernacular or geographic area. This system is meant to be standardized and thus a universal language to be understood by all. I devised a user survey that was distributed during Imagine RIT 2015 to gain clear and essential feedback by focusing on key factors of the design to make sure people can not only recognize the ideograms without text but also to understand the time mechanics as a viable solution. This as well as regular peer evaluation of design elements and crime strategy concepts by designers and a local Rochester crime analyst helped me to gauge accuracy and accessibility for a workable and viable end result. I also kept in mind some certain questions outlined in the next section as a means of reflection and to make sure I kept true to the project goals.

Reflect   Has the message been received by the intended target audience?

The target audience consisting of crime analysts, police agencies, community crime watch members and even the general public as derived from their viewing or use of a civilian crime watch system. By conducting a general survey at random about the effectiveness of the design, I can assess the effectiveness, clarity, accessibility and proper communication of the symbols with proper connotations.

Does the design reflect the integrity of the project?

Feedback from peers, professors and the RIT criminal justice department allowed for a smoother and more cohesive design process. Simplification and clarity of elements and a time based hierarchal system allow the flow of information to became easier to consume and understand.

Is the end product easily accessible and is it effective?

After careful evaluation from the design and criminal justice faculty, Carolyn Cassidy who is the Director of Crime Analysis Training for NY and the general populace, the overall concept and design was found to be effective, clear and easily understandable in both time telling and visual ideogram depictions.

Summary

Survey   The following pages are a blank representation of the survey provided as a means of evaluative process to the general populace. It consists of a matching game, multiple choice selection of time telling questions, a section asking a person's experience or knowledge with predictive policing, crime mapping and law enforcement, and a rating/comments section about the overall design. These pages are followed by a selection of three surveys of 22 conducted showing the differences in confidence and aptitude between a user who was mostly sure they had the correct matches, a person who was very sure, and a person who felt 100 percent positive.

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

Category
DNA Recovery
Homicide
Shoeprint
Missing Person
Assault
Mentally Ill
Person Located
Suicide
Speeding
Arrest
Call Heard
911 Call

Category
Warrant
Narcotics
Burglary
Haz-Mat
Arson
Abandoned Car
Fire
Amber Alert
Trail Lost
Shoplifting
Car Accident
Clue Found
Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
B	6am - 12pm
C	12am - 6am
D	6am - 12am

Community Crime Mapping　　　User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm
B	3am - 12am
C	12am - 3am
D	3am - 12pm

A	3pm - 6pm & 9pm - 12am
B	9pm - 12am & 3pm - 6pm
C	9am - 12pm & 3pm - 6pm
D	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?　Yes ☐　No ☐

If yes, to what capacity are you familiar?　Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?　Yes ☐　No ☐

If yes, to what capacity are you familiar?　Some ☐ ☐ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?　Yes ☐　No ☐

If yes, please specify your experience?

Please rate overall design of the symbol collection.　Poor ☐ ☐ ☐ ☐ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)　Simple ☐ ☐ ☐ ☐ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)　Not Sure　　Mostly Sure　　Very Sure　　100% Sure

Any further comments about the design or project in general?

*Survey
Results
Mostly Sure*

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery
Homicide
Shoeprint
Missing Person
Assault
Mentally Ill
Person Located
Suicide
Speeding
Arrest
Call Heard
911 Call

Warrant
Narcotics
Burglary
Haz-Mat
Arson
Abandoned Car
Fire
Amber Alert
Trail Lost
Shoplifting
Car Accident
Clue Found
Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
B	6am - 12pm
C	12am - 6am
D	6am - 12am

*Survey
Results
Mostly Sure*

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

	A	12pm - 3pm
	B	3am - 12am
	C	12am - 3am
	(D)	3am - 12pm

	A	3pm - 6pm & 9pm - 12am
	B	9pm - 12am & 3pm - 6pm
	C	9am - 12pm & 3pm - 6pm
	D	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?	Yes ☐	No ☑
If yes, to what capacity are you familiar?	Some ☐ ☐ ☐ ☐ ☐	Experienced
Are you at all familiar with crime mapping?	Yes ☑	No ☐
If yes, to what capacity are you familiar?	Some ☑ ☐ ☐ ☐	Experienced
Do you work for or have you worked with any form of law enforcement agencies?	Yes ☐	No ☑

If yes, please specify your experience?

Please rate overall design of the symbol collection.	Poor ☐ ☐ ☐ ☑ ☐	Well Done
Please rate overall comprehension of the system mechanics. (Time Telling)	Simple ☐ ☑ ☐ ☐ ☐	Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)

Not Sure   (Mostly Sure)   Very Sure   100% Sure

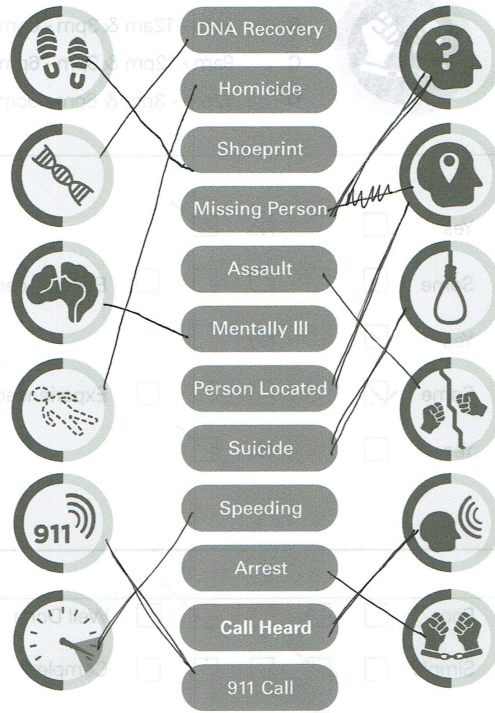**Any further comments about the design or project in general?**

Summary

Community Crime Mapping   **User Survey 2015**

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

| DNA Recovery |
| Homicide |
| Shoeprint |
| Missing Person |
| Assault |
| Mentally Ill |
| Person Located |
| Suicide |
| Speeding |
| Arrest |
| **Call Heard** |
| 911 Call |

| Warrant |
| Narcotics |
| Burglary |
| Haz-Mat |
| Arson |
| Abandoned Car |
| Fire |
| Amber Alert |
| Trail Lost |
| Shoplifting |
| Car Accident |
| Clue Found |
| Trail Found |

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
B	6am - 12pm
C	12am - 6am
D	6am - 12am

*Survey
Results
Very Sure*

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm		A	3pm - 6pm & 9pm - 12am
(B)	3am - 12am		(B)	9pm - 12am & 3pm - 6pm
C	12am - 3am		C	9am - 12pm & 3pm - 6pm
D	3am - 12pm		D	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☒

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?   Yes ☒   No ☐

If yes, to what capacity are you familiar?   Some ☐ ☒ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☐   No ☒

If yes, please specify your experience?

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☒ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☐ ☐ ☒ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   Mostly Sure   (Very Sure)   100% Sure

Any further comments about the design or project in general?

The time telling bit has promise, but I know some people are only experienced with digital clocks, so a comparison to analog way confuse them.

Survey
Results
100% Sure

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery			Warrant	
Homicide			Narcotics	
Shoeprint			Burglary	
Missing Person			Haz-Mat	
Assault			Arson	
Mentally Ill			Abandoned Car	
Person Located			Fire	
Suicide			Amber Alert	
Speeding			Trail Lost	
Arrest			Shoplifting	
Call Heard			Car Accident	
911 Call			Clue Found	
			Trail Found	

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	
B	3pm - 12am	
C	12pm - 3am	
D	3pm - 12pm	

A	12pm - 6pm	
B	6am - 12pm	
C	12am - 6am	
D	6am - 12am	

*Survey
Results
100% Sure*

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm		A	3pm - 6pm & 9pm - 12am
B	3am - 12am		B	9pm - 12am & 3pm - 6pm
C	12am - 3am		C	9am - 12pm & 3pm - 6pm
(D)	3am - 12pm		D	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?	Yes ☐	No ☑		
If yes, to what capacity are you familiar?	Some ☐ ☐ ☐ ☐ ☐			Experienced
Are you at all familiar with crime mapping?	Yes ☑	No ☐		
If yes, to what capacity are you familiar?	Some ☑ ☐ ☐ ☐ ☐			Experienced
Do you work for or have you worked with any form of law enforcement agencies?	Yes ☐	No ☑		

If yes, please specify your experience?

_____

Please rate overall design of the symbol collection.	Poor ☐ ☐ ☐ ☑ ☐		Well Done
Please rate overall comprehension of the system mechanics. (Time Telling)	Simple ☐ ☑ ☐ ☐ ☐		Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)

Not Sure   (Mostly Sure)   Very Sure   100% Sure

Any further comments about the design or project in general?

Summary

Success Survey Results

The success of the project was evaluated and achieved based on this set of evaluation criteria of 22 surveys received:

1   The message has been effectively received by intended audience in a clear and concise manner with an effective visual hierarchy.

Yes, as determined by peer review and data collect by my survey, users rated the overall design highly based on scale of (poor) 1 - 5 (well done).

- 12 of 22 people rated the design 4/5
- 10 of 22 people rated the design 5/5

After completing the matching section, the users selected their confidence in their choices which gauged overall comprehension of the symbol ideograms.

- 00 of 22 people selected not sure
- 06 of 22 people selected mostly sure
- 10 of 22 people selected very sure
- 06 of 22 people selected 100% sure

2   The project conveys concise data synthesis that can be employed as a crime prevention tool component and community awareness factor.

This tool would be a great use of community awareness as realized by my questions concerning law enforcement experience and knowledge.

- 12 of 22 people had no knowledge of crime mapping or predictive policing
- 06 of 22 people had some knowledge of crime mapping
- 04 of 22 people some knowledge of predictive policing

3   Visualization and conceptualization through imagery allows for easy learning and strategic tactical implementation.

The time telling aspect takes time to get used to as I have found myself but for first time recognition results:

- 12 of 22 people thought the time telling was mostly complex difficulty
- 08 of 22 people thought the time telling was simple difficulty
- 02 of 22 people thought the time telling was intermediate difficulty

These responses found overall near complete comprehension of the symbols and relative ease of use for my time system but there is a learning curve that lowers over increased exposure of the system.

Significance and Inquiry

This thesis strives both fill a gap in the realm of crime mapping but also to experiment with modes of data visualization via ideogramic symbols. It moves to question the usability of an icon and push its limits as a visual communication tool of quantitative data. The set is an abstraction of the breadth of work done each day by police officers and the analysts who relay information to them. The mechanics of the time telling coupled with ideograms of actions and situations relay multiple layers of information at a glance. Typically analysts don't bother to display crimes organized by time or on a constant basis. Crime maps tend to be developed on a longer time scale of weekly or monthly and that's where this thesis benefits in that it gives officers a mode of attaining vital information on a developing daily basis. These symbols question the paradigm of how crime mapping is carried out and how said maps are displayed. Because of their dynamic nature and the overall flexibility of telling time of events on two layers of a relative time period and AM/PM cycle, these symbols become a time based tactical analysis tool. They have great influence being shown on a daily report of events or daily update for each change in the shifts of officers each day to allow them the ability to see all that has happened daily. Officers tend to not gain this information and only have direct connections and knowledge of crimes or events that happen during their individual shift.

This thesis shows new avenues of exploration for symbol development and allows for a conversation and influence into adaptable dynamic symbol systems. They raise questions into the field of data visualization and infographics by combining systems into one cohesive language of pictorial thought. A dynamically changing symbol set as this begs the question of what else is possible? It also questions the extent of what makes up a graphic symbol and why sets cannot do more to increase a data rich solution? This thesis shows that icons can do more than be a pictogram or ideogram and designers should look to experiment on modes of developing adaptable icon systems especially where data resources may be limited on a map. It shows symbols can do more to increase the amount of information displayed on something such as a map and questions how maps can integrate a multi-layer icon set to display information in a new light such as symbol systems like graduated or proportional symbols adapt. Dynamically changing symbols can benefit our world in many applications and scenarios including signage, mapping, infographics, and in a plethora of subjects. This system becomes a tactical problem oriented policing tool that is effective, innovative and helpful to make officers, citizens and communities safer. The questions of how designers integrate information on a small scale based on a adaptable solution are conversations worth exploring as this work shows. I can now share such knowledge and continue to explore what makes up a symbol and how much information it conveys in the years to come.

Conclusion

Updatability Thoughts

Often times symbol sets may not be all inclusive to a particular data set and thus the need for additions is necessary. Alternatively, some symbols may need to be updated as years pass, technology advances and visual language develops. Therefore, a means of storing the symbol sets that allows for the ability to add and update is important. Though this thesis aims to only pursue creating four symbol sets identified previously as well as a usage guidelines booklet, the development of a updatability platform could be created in the future as a separate component or an extension to this thesis. Future solutions to this work as well as add to the symbol sets could include creating a website with a sql database component where symbols can be uploaded and downloaded for addition and usage. Alternatively, a symbol style set for each data set could be created using ESRI ArcGis and both hosted on their community maps program server to be downloaded and added to by the ESRI community. Finally, the symbols could be hosted by thenounproject.com in collaboration with the AIGA to download the symbols as well as upload new additions.

Next Steps

In the future I intend to complete each category of crime, field work, emergency and search and rescue with a full, more fleshed out collection of symbols. I also intend to disperse my thesis via the 2015 Adobe Design Achievement Awards for social impact design as well as shown at the 2015 RIT VCDE MFA Thesis Show. I would also possibly look toward sending my work to the National Institute of Justice and Bureau of Justice Statistics and the International Association of Crime Analysts.

Appendix Contents

Community Crime Mapping

Increasing Predictive Policing with Dynamic Symbol Sets

Michael Chaszczewski

Rochester Institute of Technology
College of Imaging Arts and Sciences
Visual Communications Design
MFA Thesis Proposal
Fall 2014

Rochester Institute of Technology
College of Imaging Arts and Sciences
School of Design
MFA Visual Communication Design

Title	Community Crime Mapping: Increasing Predictive Policing with Dynamic Symbols Sets
Submitted By	Michael G. Chaszczewski
Date	October 28th, 2014

Committee Approval

Chief Adviser   Chris Jackson, MFA Visual Communications Design, School of Design

Signature of Chief Thesis Adviser   Date

Associate Adviser   Nancy Ciolek, Visual Communications Design, School of Design

Signature of Associate Thesis Adviser   Date

Associate Adviser   Dr. John McCluskey , Criminal Justice, School of Liberal Arts

Signature of Associate Thesis Adviser   Date

MFA Candidate   Michael G. Chaszczewski, Visual Communications Design, School of Design

Signature of MFA Thesis Candidate   Date

Abstract

Abstract

Crime prevention is an important area of study in our society as it plays an integral role in the lives of citizens and the officers who protect them from harm. Law enforcement agencies such as local police enlist the aid of strategic counter crime plans to tackle the overbearing urgency that is created everyday when crimes are committed. Crime mapping is one of these tools allowing officers to understand criminalistic data and map out crime routes, hot zones and predict where the next crime may occur. Through mapping spatial relationships of crime perpetrators and victims, predictable policing efforts can be put into effect that cut crime rates and help to better serve the community by policing areas that need it most. This mapping technique is also important in future efforts to catch perpetrators and solve previous crimes.

Crime mapping is a strategy that is used by most law enforcement agencies but lacks a cohesive unified system of displaying the data received and interpreting it to formulate a policing pattern. This tool could prove to increase public safety and effectiveness of police routes if the information was more organized and displayed in clear manner so that specific data is distinctly and quickly recognizable at all times. By improving the functionality of crime mapping, communities can become safer and also by implementing a unified system, multiple police agencies could more easily share valuable criminalistic data.

This thesis serves to fill the gap in crime mapping by unifying the strategy with a series of standard icon system sets that span the breadth of law enforcement duties. A dynamic flexible icon system strives to create order and concise visual interpretation between officers and analysts within departments and between departments. The system is flexible, interchangeable and dynamic by communicating the data based on time of day as well to express and quantify the information efficiently. Furthermore, by applying this system to a layered interactive map(ESRI ArcGis), officers can then focus on specific efforts that involve certain crime categories without an over abundance of information. A print supplement design will encompass all the symbols into a stylistic guide of development and application and feature each icon category.

Keywords

infographic, information design, web-based, print, symbol sets, predictive policing, crime prevention, public safety, prevention strategy

Problem Statement and Situational Analysis

Situation   Crime prevention plans are essential tools for law enforcement agencies throughout the United States allowing officers to better understand criminalistic data and formulate counter measures tailored to the data. Crime mapping, in particular, focuses on mapping criminal activity as it occurs and identify hot spots where crime is most prominent.[1] The crime map is Geo-specific depending on the jurisdiction of law enforcement agencies being on the local, county, state or national level. Through mapping the spatial relationships of crime targets, predictable policing efforts can be put into effect that cut the rate of crime and allow officers to better deter crime on their specific patrol lines.[2] While crime mapping identifies where the actual crime took place, it also details where the perpetrator lives or works. Including perpetrator and victim data is essential to crime prevention mapping as crimes are committed within a criminal's comfort zone.[3]

Crime mapping techniques are meant to allow for law officers to gain a more complete understanding about the criminal activity that occurs along their patrols and a over arching view of their scope of jurisdiction. Mapping criminal activity is typically done at an individual law agency level with map elements that do little to show a unified system. Ergo, the crime prevention measures that should be derived from crime mapping become confusing. A dynamic unified system of map elements and icons will do well to make crime mapping a viable and clear tool for officers to increase community security.

Problem   Can the development of dynamically flexible icon system sets combined with an in-depth analysis of crime prevention strategies, spur an increase in predictive policing effectiveness and overall community safety?

A dynamic symbol solution system will be developed to indicate multiple detail levels involved in community crime. The icon system will unify map visual language as well as a simple representational map of a Geo-specific area. It will further increase the levels of communication by having changes to any given icon based on time of day and date. The system will incorporate multiple data sets spanning both criminal and non criminal activity as well as supporting mapping elements. The design includes multiple categories each with subsets of data but be law department customizable to an extent. The system as a whole will allow for cross communication between departments to be easier and more effective. By utilizing the symbols using systems level thinking, they can apply to multiple fields of interest and organizations outside police such as neighborhood watches. A supplemental print design will encompass all the symbols into a stylistic guide of development and application and feature each icon data set category.

The use of Adobe Illustrator and InDesign will aid the development and production of this project. This thesis will explore iconography and how it is systematically used as well as dynamically expressing information changes to give new meaning.

Community Crime Mapping   [1]Perry, Walter L., et al. 2013. "Predictive Policing : The Role of Crime Forecasting in Law Enforcement Operations". CA, RAND Corp. 893-1333.

[2] Ibid

[3] Ibid

Crime Mapping & Crime Prevention
By Mark Beaudry
Security Management 44 (5): 100-112. (2000)

This article discusses both basic and applied research in analytical crime mapping. It further details a plethora of tools used by today's law enforcement and research communities. Some of these resources include STAC, a toolbox of spatial analysis statistics which support law enforcement decisions by quickly summarizing point data. This text is useful to my research as a means of subject matter in crime mapping and is a reference at how crime data is interpreted and represented.

Crime Mapping
By Oliver Ribaux
Forensic Science International 136: 10-16. (2003)

A section from the Forensic Science International Journal, this text details crime mapping through the eyes of forensic scientists and shows how they utilize and interpret their own set of data about crime occurrences. It further delves into the relation of spatial maps and perpetrator maps that show where offenders live, work and the known path traveled leading up to and after committing a crime. This is useful to my research in that shows how a particular specialization of the police force utilizes crime mapping and depicts specific imagery within crime maps.

Predictive Policing and Reasonable Suspicion
By Andrew Fergusun
Emory Law Journal 62.2: 259-325. (2013)

This text tells of the popular origin of crime mapping and specifically predictive policing from the LAPD's Real Time Analysis and Critical Response Division. It further shows how predictive policing works and how police use the data to take action. For instance, showing a police stake out of an area of predicted criminal activity. The text details notions of Fourth Amendment concepts like probable cause, reasonable suspicion, informant tips, drug courier profiles and high crime areas. This information is useful to my research to show how predictive policing is put to use and how officers synthesize crime map data in the field to patrol areas and prevent crime before it happens.

Books

Predictive Policing : The Role of Crime Forecasting in Law Enforcement Operations
By Walter Perry
Santa Monica, CA, USA: RAND Corporation. (2013)

This book details predictive policing as an application of analytical technique and quantitative technique to identify targets for police intervention. It shows how to prevent crime or solve past crimes by making statistical predictions. The book also tells of the effectiveness of various crime prevention techniques like crime mapping and shows its strengths and weaknesses. This book is useful as a resource of showing what crime mapping is and how it is used but also pointing out its effectiveness and displaying strengths and weaknesses in the system of visual information.

Crime Analysis, Process, Data and Purpose
By Rachel Boba Santos
Los Angeles, CA, USA: Sage. (2013)

This book is a basic introduction to the field of crime analysis covers its history, as well as key concepts, data, and techniques. The text focuses on fundamental concepts and practical application as well providing illustrated examples. The book also details specific crime techniques with a section on crime mapping, showing how data is converted into map form and usage information. This is a helpful book from the subject matter standpoint of thesis and provides a clear and easy overview and introduction of crime analysis as well as some detailed insights into crime mapping.

GIS in Law Enforcement Implementation Issues and Case Studies
By Mark Leipnik and Donald P. Albert
London, England: Taylor and Francis. (2003)

This book details the use of GIS as well as the technology behind it to make it work. It further tells of insights into a suite of tools suited for crime mapping and analysis. This book also contains chapters on implementation, data sharing, web-based GIS and database design. This text is useful as a research reference that tells how specific law enforcement agencies are using GIS to solve crimes, deploy resources, and gauge the effectiveness of crime prevention.

Books

The Power of Visual Storytelling
By Jason Lankow
Hoboken, NJ, USA: John Wiley & Sons. (2012)

This book focuses mainly on the implementation of infographics in improving communication. The book looks at infographics by showing their use in marketing as well as traditional application in reporting information. The book also shows some of the related purposes for infographic use in other fields. This book is a useful resource as an overview of infographics and how it improves the flow of information between the data and viewer.

Symbols: A Universal Language
By Joseph Piercy
London, England: Michael O'Mara Books Limited. (2013)

Symbols: A Universal Language is a book that looks at the story behind the world's most famous symbols. It shows the importance that has been attached to the simplest of ideas and features important symbols from religion, politics and popular culture. The text further highlights the roles symbols have played throughout history and how they have shaped our understanding of the world. This is an interesting book that is useful as a reference to see how simple shapes, ideas and compositions work to communicate unique messages. It is also useful as a resource into communicating without any use of text.

Decoding Design: Understanding and Using Symbols in Visual Communication to discover the hidden meanings inside common logos and designs.
By Maggie Macnab
Cincinnati, OH, USA: HOW Books. (2008)

This book reveals how common symbols and shapes such as circles, squares and triangles lend themselves to bring on a greater meaning to a design. The text deconstructs famous logos and other sample designs to show how to communicate complex information quickly and intuitively with universal patterns. This book further details how other disciplines, such as philosophy, math, and physics, influence great design and help show ideas in a holistic and compelling manner. This book is a helpful resource to my research and design by showing how simple geometric forms can influence and strengthen an overall design to communicate new and innovative ideas as well as a clear message.

This means this, this means that: a user's guide to semiotics
By Sean Hall
London, England: King Publishing. (2007)

This book delves into the notion of semiotics and sign theory. The text uses visual examples explain and detail such theories and provides practical examples of how meaning is made in contemporary culture through the use of signs and symbols and the types of signals such devices communicate. This book is an essential resource for my thesis by depicting the thought process and theory behind the messages that symbols and signs display. By delving into the theories and seeing what types of signals symbols can convey, I can utilize that knowledge in my designs to make sure they communicate a clear and specific message.

1000 Icons, Symbols + Pictograms: Visual Communications for Every Language
By Blackcoffee Designs
Gloucester, MA. USA: Rockport. (2006)

This book depicts 1000 different designs for symbols, icons and pictograms from numerous countries around the world. This text is mainly useful as an inspirational book of different types of designs and styles.

Symbols, Signs & Signets
By Ernst Lehner
New York, NY, USA: Dover Publications. (1950)

This book showcases 1355 signs, seals, and symbols from around the world showing drawings, heraldic devices of the Middle Ages, to modern cattle brands and hobo sign language. This book is divided into 13 sections showing the designs and styles of different cultures and subjects including Symbolic Gods and Deities, astronomy, astrology, alchemy, magic, and mysticism. It also includes religious symbols, heraldry, monsters and imaginary figures; Japanese crests, marks and signets. This is another useful resource of inspiration and stylistic approaches to symbolism and iconic communication for my research.

Give Me a Sign!: What Pictograms Tell Us Without Words
By Tiphaine Samoyault
New York, NY, USA: Viking. (1997)

This text showcases many colorful signs from all over the world along with interesting information about the history and use of signs in everyday life. It also tells of some sign theory and how pictograms communicate the message without words. This text is useful to my research as a resource of inspiration and insight into sign theory and specific meanings behind pictograms.

Survey of Literature

Websites

"NIJ Home Page NIJ Home." National Institute of Justice.
http://www.nij.gov/Pages/welcome.aspx

The National Institute of Justice is the research and evaluation agency of the United States Department of Justice. This site is helpful to my research providing insights to many theories and crime prevention techniques as a comprehensive resource of the criminal justice system.

"Center for Problem-Oriented Policing." Center for Problem-Oriented Policing.
http://www.popcenter.org/problems/

The POP Center site encompasses a number of guides about how police can reduce the harm caused by specific crime and disorder problems. Each guide is informed by a review of the research literature and police practice, and peer-reviewed by a police officer, a police executive and a researcher. This site is a great resource for my research about crime mapping and gives insight into how crimes are classified into categories utilizing police officer and law official experiences.

"Crime Mapping, Crime Analysis, & Problem Analysis." Police Foundation. http://www.policefoundation.org/content/crime-mapping-crime-analysis-problem-analysis

This site depicts many resources and case studies specifically tailored to crime mapping and predictive policing techniques. It also shows examples of problem analysis and crime analysis as well. It is a good reference about crime mapping utilizing case studies in different cities and show how police officers use the data in the filed.

"Law Enforcement." ESRI GIS.
http://www.esri.com/industries/public-safety/law-enforcement

The ESRI ArcGis site section on law enforcement shows numerous crime mapping applications as well as examples, tutorials and insight into how the software works. It is a good reference to see possible applications of crime mapping and to get an idea of how the software works and is used.

Design Methodology

Objective The main purpose of this thesis is to design a series of dynamic symbol sets that unify the data employed in crime analyst maps and streamline the flow of communication to make the visual recognition easier and clearer to understand. The system would ideally be implemented within the ArcGis mapping application to strengthen and standardize the counter crime strategy for police agencies across the country. The primary component of the symbol system is that it will be dynamic and encompass a large breadth of data sets including crime, non crime data as well as field data and search and rescue applications. This will allow for the sharing and comparison of data to be easily implemented among and across police agencies. Using systems think and theory the system can be applied to a multitude of applications within law enforcement and also within public organizations. Furthermore, a print design of the icon sets could be developed for to create a comprehensive guide to the symbol system and its applications and development. The project utilizes design theory and application to meld an increased understanding of predictive policing strategies with graphic design to inform and become a viable tool for community safety.

Audience The target audience for this project consists of crime analysis training professionals, police agencies/officers, concerned citizens, crime watches and first responders.

Process The process of completing a successful symbol system and print design conforms to the following system criteria:

1 Research the predictive policing strategies and visual maps that exist to gain a better understanding of the target audience needs for a counter crime tool.

2 Collect and consume all background information about predictive policing and crime mapping and the broader scope of criminalistics as well as design approaches in information and icon design as well as systems thinking including semiotics.

3 Brainstorm design approaches correlating to information design and symbol systems.

4 Ideation of dynamic icon design approaches.

5 Prototyping of top level ideation approaches to symbol systems and booklet.

6 Review of symbol system for accessibility, readability and communication feedback.

7 Refinement of tested icons and develop final booklet design.

8 Present finished product.

Assets Dynamic Icons: 60 - 70 symbols
   Icon Style Guide Booklet: B5 7 x 10 inches/ 22+ pages

Categories   Initial research of crime mapping and criminalistics spawned a series of key categories that will serve as the varying icon set categories of the design. Each category contains a sub set of data that has a more specific icon application as opposed to the overarching category. The top level categories are divided based on their relation to crime, non crime field data or search and rescue data.

| Criminal		Emergency		Search and Rescue		Field Activity	
Arson	Assault	Accidents	Hazardous Materials	Person Missing	Person Located	Speeding	Respond Call
Burglary	Drugs	911 Call	Suicide	Amber Alert	Point Last Seen	Field Interview	FI Registrant
Homicide	Fraud	Metally Ill	Fire	Clue Found	Call Heard	Police Vehicle	Warrant
Sex Crimes	Weapons	Natural Disaster	Explosion	Vehicle Found	Body Found	Arrest	Chase
Vehicular Crimes	Vandalism			Signal Location	Trail Lost	Shoe Print	Finger Print
Gambling	Disorderly Conduct			Trail Found	Scent Found	Foot Print	Tracks
Capital Offense	Federal Offense					DNA Recovery	Forensic Collection
Hate Crimes	Abuse						

Sketch
Ideation

Below are some current design ideation sketches for an example symbol and some ways to relate time, frequency and inter relation between symbols.
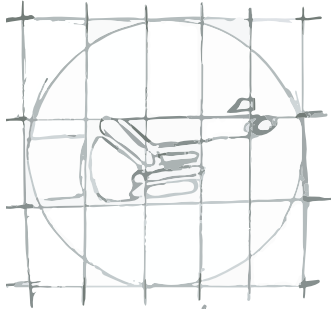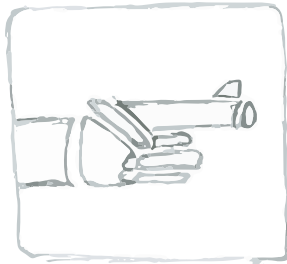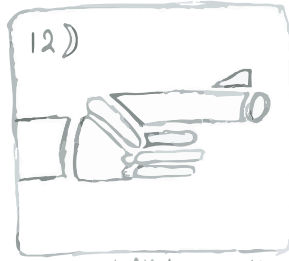
Symbol Grid
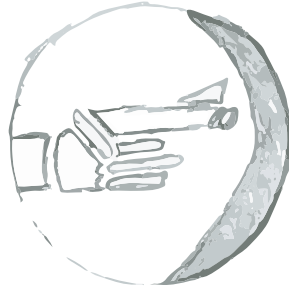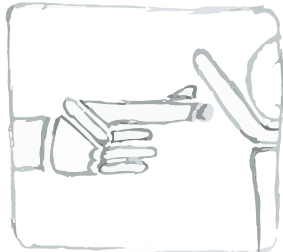
Symbol Night variation
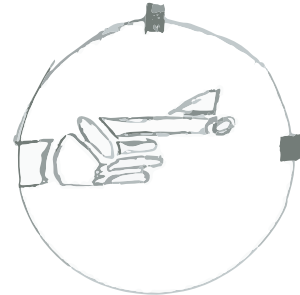
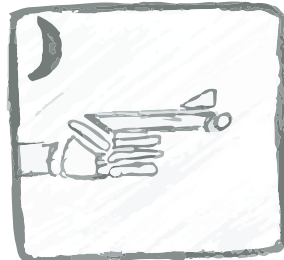Time variation

Handgun Symbol

Symbol Night Variation 2

Size/frequency relation

Armed Robbery Symbol

Symbol Night variation 3

Design Implementation

Requisites A successful end product requires requisites in knowledge of criminalistics, predictive policing strategies, as well as skills in information design, infographics and symbols. The use of Adobe Illustrator, InDesign and Photoshop will be utilized to aid the development and production of this project. Each software employs certain specialties in typography, graphic illustration and photography which are essential components needed to create a proper end product.

Software The software used to accomplish this proposed project consists of Adobe Illustrator InDesign and Photoshop.

Product The finished product result for this project consists of approximately 60-70 symbols within a series of forty+ categories of information divided between crime, emergency, search and rescue and field data. The symbols are dynamically flexible within a map system and change based on time, date frequency, ect. to display quantified data clearly and efficiently. They will further employ the ideas of graduated vs proportional icons that can show density or quantity of incidents using scale. Using systems thinking including map and icon semiotics as well as sign theory, a series of applications can be shown to adapt this symbol system and broaden its use on a larger scale. Furthermore, the booklet will encompass the full scope of the symbols and possible applications as well as ideation or development research to the end icon sets.

Constraints Because the symbol system is meant to be used foremost a standardization component for law enforcement agencies there are some constraints for developing the symbols. Each police department has its own specific assigned colors for their mapping data which would be problematic if an icon was the wrong color for a category in their system. Therefore, the icons will be customizable by being developed in black and white so that a background color of the department's choice can be assigned but still maintain the integrity of the icon system and allow the symbols to still represent the same data.

Adaptation Often times symbol sets may not be all inclusive to a particular data set and thus the need for additions is necessary. Alternatively, some symbols may need to be updated as years pass, technology advances and visual language develops. Therefore, a means of storing the symbol sets that allows for the ability to add and update is important. Though this thesis aims to only pursue creating four symbol sets identified previously as well as a usage guidelines booklet, the development of a updatability platform could be created in the future as a separate component or an extension to this thesis. Future solutions to this work as well as add to the symbol sets could include creating a website with a sql database component where symbols can be uploaded and downloaded for addition and usage. Alternatively, a symbol style set for each data set could be created using ESRI ArcGis and both hosted on their community maps program server to be downloaded and added to by the ESRI community. Finally, the symbols could be hosted by thenounproject.com in collaboration with the AIGA to download the symbols as well as upload new additions.

Evaluation Plan

Evaluate Proper evaluation of the project criteria and product should employ physical interactions between the product crime professionals, professors and particularly police officers. Evaluation by the Rochester, NY police department as well as members from the Monroe County Crime Analysis Center will allow for clear and essential feedback by focusing on key factors of the design to make it work more effectively as a system of relaying data as well as gaining user empathy. Furthermore, a peer review of design elements and crime strategy concepts for accuracy and accessibility could also be initiated.

Reflect Has the message been received by the intended target audience?

> *The target audience consisting of crime analysis training professionals, police agencies and the community crime watch members from Rochester, NY can be utilized to assess the effectiveness, clarity and accessibility of the data being represented by the symbol system.*

Does the design reflect the integrity of the project?

> *Feedback from peers and police officers can allow for a smoother and more cohesive design process. Simplification and clarity of elements and a hierarchal system will allow the flow of information to became easier to consume and understand which is crucial to the success of the project.*

Is the end product easily accessible and is it effective as a predictive policing strategy?

> *After careful evaluation from peers, police officers at the Rochester, NY police department and Monroe County Crime Analysis Center, the overall concept and design will be tested in areas of accessibility clarity and effective summaries of the topic process at hand.*

Success The success of the project will be achieved based on the evaluation criteria set forth:

1 The message has been effectively received by intended audience in a clear and concise manner to with an effective visual hierarchy.

2 The project has impacted the audience positively and conveys concise data synthesis that can be employed as a crime prevention tool component and community awareness factor.

3 Visualization and conceptualization through imagery allows for easy learning and strategic implementation.
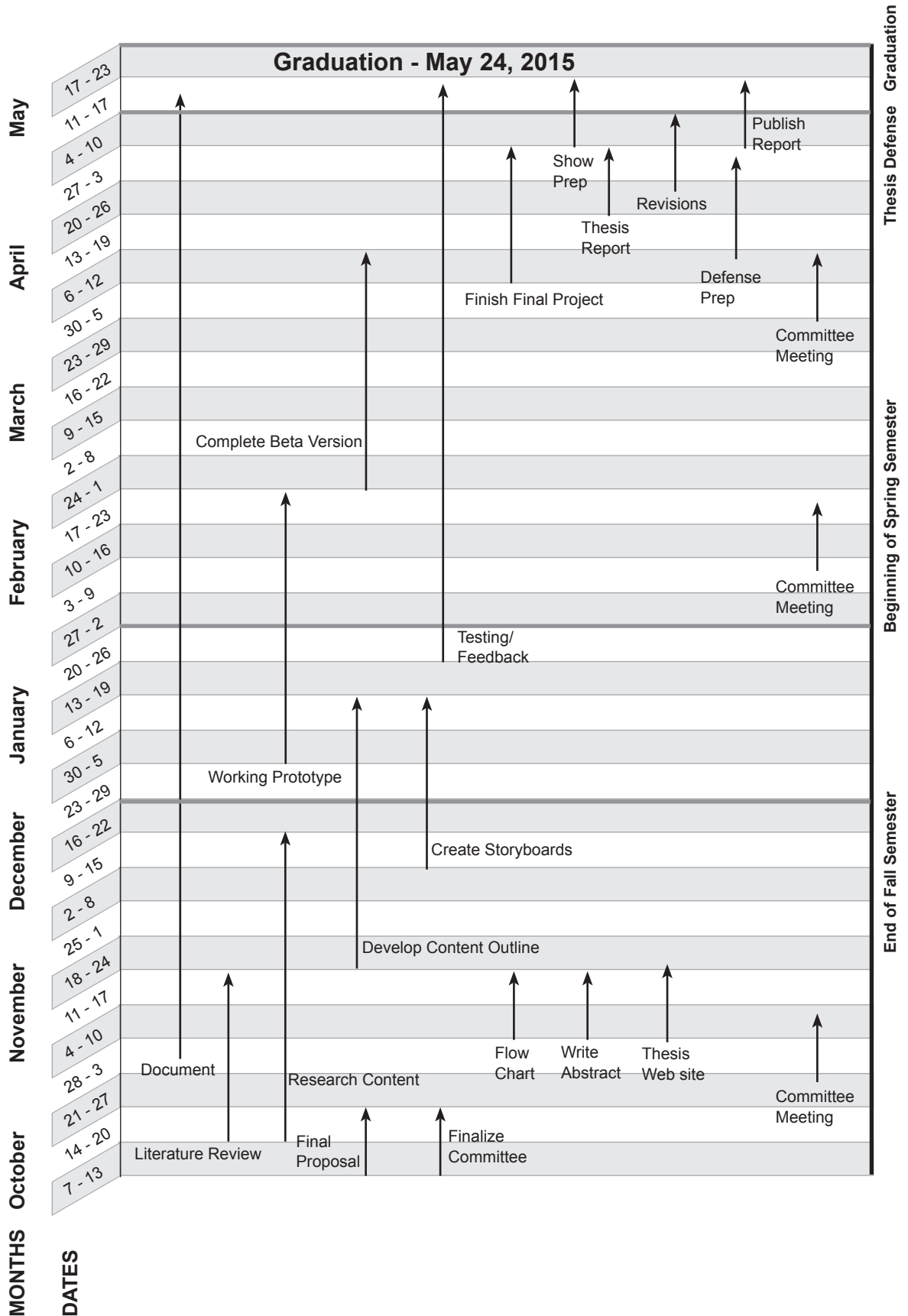
Dissemination, Consideration and Contribution

Dissemination　My thesis will be dispersed via the 2014 Data Visualization Challenge set forth by the National Institute of Justice and Bureau of Justice Statistics. Furthermore, a blog and print copies of my symbol designs could be sent to law enforcement agencies around the state in varying levels of local police, sheriffs and state police as well as local crime prevention organizations such as Rochester Neighborhood Association and Monroe County Crime Analysis Center. I also intend to submit my thesis to the Adobe Achievement Awards as well as the AIGA awards and the 2015 RIT MFA Thesis Show.

Budget

Travel:	$100
Printing:	$175
Print Surfaces:	$80
Software:	$120

Considerations　The usability testing of actual police officers is essential to assessing the success and true effectiveness of my designs. The availability for officers to provide feedback and have meeting may be short. Furthermore, the information provided in the designs especially a print for newspapers needs to be accessed to see if certain data cannot be disclosed to the public and is for police eyes only.

Contributions　This thesis benefits the field of visual communication design by developing the notion of adaptable/flexible symbols that relay data that is relational to time and quantity. It delves into how these symbols can be used and adopted by multiple organizations utilizing the same data, tailoring it to their established system and still communicating the same information across each respective use. This thesis also digs into semiotics and sign theory to achieve its goal.

Design Timeline

Graduation - May 24, 2015

MONTHS	DATES
May	17 - 23
	11 - 17
April	4 - 10
	27 - 3
	20 - 26
	13 - 19
March	6 - 12
	30 - 5
	23 - 29
	16 - 22
February	9 - 15
	2 - 8
	24 - 1
	17 - 23
January	10 - 16
	3 - 9
	27 - 2
	20 - 26
December	13 - 19
	6 - 12
	30 - 5
	23 - 29
	16 - 22
November	9 - 15
	2 - 8
	25 - 1
	18 - 24
October	11 - 17
	4 - 10
	28 - 3
	21 - 27
	14 - 20
	7 - 13

Graduation

Thesis Defense

Beginning of Spring Semester

End of Fall Semester

Publish Report

Show Prep

Revisions

Thesis Report

Finish Final Project

Defense Prep

Committee Meeting

Complete Beta Version

Committee Meeting

Testing/ Feedback

Working Prototype

Create Storyboards

Develop Content Outline

Flow Chart

Write Abstract

Thesis Web site

Committee Meeting

Document

Research Content

Literature Review

Final Proposal

Finalize Committee

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User 1

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery

Homicide

Shoeprint

Missing Person

Assault

Mentally Ill

Person Located

Suicide

Speeding

Arrest

Call Heard

911 Call

Warrant

Narcotics

Burglary

Haz-Mat

Arson

Abandoned Car

Fire

Amber Alert

Trail Lost

Shoplifting

Car Accident

Clue Found

Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
B	6am - 12pm
C	12am - 6am
D	6am - 12am

User 1

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	
B (circled)	3am - 12am	
C	12am - 3am	
D	3am - 12pm	

A	3pm - 6pm & 9pm - 12am	
B (circled)	9pm - 12am & 3pm - 6pm	
C	9am - 12pm & 3pm - 6pm	
D	12pm - 3pm & 6pm - 9pm	

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☒

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?   Yes ☒   No ☐

If yes, to what capacity are you familiar?   Some ☐ ☒ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☐   No ☒

If yes, please specify your experience?

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☒ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☐ ☐ ☒ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   Mostly Sure   (Very Sure)   100% Sure

Any further comments about the design or project in general?

> The time telling bit has promise, but I know some people are only experienced with digital clocks so a comparison to analog may confuse them.

User 2

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol?
Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery

Homicide

Shoeprint

Missing Person

Assault

Mentally Ill

Person Located

Suicide

Speeding

Arrest

Call Heard

911 Call

Warrant

Narcotics

Burglary

Haz-Mat

Arson

Abandoned Car

Fire

Amber Alert

Trail Lost

Shoplifting

Car Accident

Clue Found

Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	
B	3pm - 12am	
C	12pm - 3am	
D	3pm - 12pm	

A	12pm - 6pm	
B	6am - 12pm	
C	12am - 6am	
D	6am - 12am	

User 2

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	
(B)	3am - 12am	
C	12am - 3am	
D	3am - 12pm	

A	3pm - 6pm & 9pm - 12am	
(B)	9pm - 12am & 3pm - 6pm	
C	9am - 12pm & 3pm - 6pm	
D	12pm - 3pm & 6pm - 9pm	

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☒

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐   Experienced

Are you at all familiar with crime mapping?   Yes ☒   No ☐

If yes, to what capacity are you familiar?   Some ☐ ☒ ☐ ☐ ☐   Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☐   No ☒

If yes, please specify your experience?

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☒ ☐   Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☐ ☐ ☒ ☐   Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   Mostly Sure   (Very Sure)   100% Sure

Any further comments about the design or project in general?

The time telling bit has promise, but I know some people are only experienced with digital clocks so a comparison to analog may confuse them.

User 3

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery

Homicide

Shoeprint

Missing Person

Assault

Mentally Ill

Person Located

Suicide

Speeding

Arrest

Call Heard

911 Call

Warrant

Narcotics

Burglary

Haz-Mat

Arson

Abandoned Car

Fire

Amber Alert

Trail Lost

Shoplifting

Car Accident

Clue Found

Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

		A	12pm - 3pm
		B	3pm - 12am
		C	12pm - 3am
		D	3pm - 12pm

		A	12pm - 6pm
		B	6am - 12pm
		C	12am - 6am
		D	6am - 12am

User 3

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm
B (circled)	3am - 12am
C	12am - 3am
D	3am - 12pm

A	3pm - 6pm & 9pm - 12am
B (circled)	9pm - 12am & 3pm - 6pm
C	9am - 12pm & 3pm - 6pm
D	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing? Yes ☐ No ☒

If yes, to what capacity are you familiar? Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping? Yes ☒ No ☐

If yes, to what capacity are you familiar? Some ☐ ☒ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies? Yes ☐ No ☒

If yes, please specify your experience?

Please rate overall design of the symbol collection. Poor ☐ ☐ ☐ ☒ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling) Simple ☐ ☐ ☐ ☒ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice) Not Sure   Mostly Sure   (Very Sure)   100% Sure

Any further comments about the design or project in general?

> The time telling bit has promise, but I know some people are only experienced with digital clocks so a comparison to analog may confuse them.

User 4

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery

Homicide

Shoeprint

Missing Person

Assault

Mentally Ill

Person Located

Suicide

Speeding

Arrest

Call Heard

911 Call

Warrant

Narcotics

Burglary

Haz-Mat

Arson

Abandoned Car

Fire

Amber Alert

Trail Lost

Shoplifting

Car Accident

Clue Found

Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

	A	12pm - 3pm
	B	3pm - 12am
	C (circled)	12pm - 3am
	D	3pm - 12pm

	A	12pm - 6pm
	B (circled)	6am - 12pm
	C	12am - 6am
	D	6am - 12am

User 4

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

	A	12pm - 3pm
	B	3am - 12am
	C	12am - 3am
	D	3am - 12pm

	A	3pm - 6pm & 9pm - 12am
	B	9pm - 12am & 3pm - 6pm
	C	9am - 12pm & 3pm - 6pm
	D	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing? Yes ☐ No ☒

If yes, to what capacity are you familiar? Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping? Yes ☒ No ☐

If yes, to what capacity are you familiar? Some ☐ ☒ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies? Yes ☐ No ☒

If yes, please specify your experience?

Please rate overall design of the symbol collection. Poor ☐ ☐ ☐ ☒ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling) Simple ☐ ☐ ☐ ☒ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice) Not Sure   Mostly Sure   (Very Sure)   100% Sure

Any further comments about the design or project in general?

The time telling bit has promise, but I know some people are only experienced with digital clocks so a comparison to analog may confuse them.

User 5

Community Crime Mapping — User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery

Homicide

Shoeprint

Missing Person

Assault

Mentally Ill

Person Located

Suicide

Speeding

Arrest

Call Heard

911 Call

Warrant

Narcotics

Burglary

Haz-Mat

Arson

Abandoned Car

Fire

Amber Alert

Trail Lost

Shoplifting

Car Accident

Clue Found

Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A   12pm - 3pm
B   3pm - 12am
C   12pm - 3am
D   3pm - 12pm

A   12pm - 6pm
B   6am - 12pm
C   12am - 6am
D   6am - 12am

User 5

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

	A	12pm - 3pm
	B	3am - 12am
	(C)	12am - 3am
	D	3am - 12pm

	A	3pm - 6pm & 9pm - 12am
	B	9pm - 12am & 3pm - 6pm
	C	9am - 12pm & 3pm - 6pm
	(D)	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☒

If yes, to what capacity are you familiar?   Some ☒ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?   Yes ☐   No ☒

If yes, to what capacity are you familiar?   Some ☒ ☐ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☒   No ☐

If yes, please specify your experience? *SCAR DEPT, VOLNS WIR MESA on MANY HKACTA : ALLEGANY CANS*

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☐ ☒ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☐ ☒ ☐ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   Mostly Sure   Very Sure   (100% Sure)

Any further comments about the design or project in general?

User 6

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol?
Based on the symbols you saw on the nearby
computer and informational poster, please draw a
line connecting each category to a symbol using
your best guess.

DNA Recovery

Homicide

Shoeprint

Missing Person

Assault

Mentally Ill

Person Located

Suicide

Speeding

Arrest

Call Heard

911 Call

Warrant

Narcotics

Burglary

Haz-Mat

Arson

Abandoned Car

Fire

Amber Alert

Trail Lost

Shoplifting

Car Accident

Clue Found

Trail Found

Based on what you read about the functionality
on the nearby poster, can you tell the time when
the following events happened? Please circle
your best guess.

A   12pm - 3pm
B   3pm - 12am
C   12pm - 3am
D   3pm - 12pm

A   12pm - 6pm
B   6am - 12pm
C   12am - 6am
D   6am - 12am

User 6

Community Crime Mapping   *User Survey 2015*

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	
B	3am - 12am	
(C)	12am - 3am	
D	3am - 12pm	

A	3pm - 6pm & 9pm - 12am
B	9pm - 12am & 3pm - 6pm
C	9am - 12pm & 3pm - 6pm
(D)	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?	Yes ☑		No ☐			
If yes, to what capacity are you familiar?	Some ☐	☑	☐	☐	☐	Experienced
Are you at all familiar with crime mapping?	Yes ☑		No ☐			
If yes, to what capacity are you familiar?	Some ☐	☑	☐	☐	☐	Experienced
Do you work for or have you worked with any form of law enforcement agencies?	Yes ☐		No ☑			

If yes, please specify your experience?

Please rate overall design of the symbol collection.	Poor ☐	☐	☐	☐	☑	Well Done
Please rate overall comprehension of the system mechanics. (Time Telling)	Simple ☐	☐	☐	☑	☐	Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)

Not Sure   Mostly Sure   **(Very Sure)**   100% Sure

Any further comments about the design or project in general?

Great Job clone!

User 7

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery	Warrant
Homicide	Narcotics
Shoeprint	Burglary
Missing Person	Haz-Mat
Assault	Arson
Mentally Ill	Abandoned Car
Person Located	Fire
Suicide	Amber Alert
Speeding	Trail Lost
Arrest	Shoplifting
Call Heard	Car Accident
911 Call	Clue Found
	Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	
B	3pm - 12am	
C	12pm - 3am	
D	3pm - 12pm	

A	12pm - 6pm	
B	6am - 12pm	
C	12am - 6am	
D	6am - 12am	

User 7

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm
B	3am - 12am
C	12am - 3am
D (circled)	3am - 12pm

A	3pm - 6pm & 9pm - 12am
B	9pm - 12am & 3pm - 6pm
C	9am - 12pm & 3pm - 6pm
D (circled)	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☒

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?   Yes ☐   No ☒

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☐   No ☒

If yes, please specify your experience?

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☒ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☐ ☐ ☒ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   Mostly Sure   Very Sure   100% Sure

Any further comments about the design or project in general?

Pm + AM get hard to distinguish
Didn't read too much about the system,
but understood the symbols + the time fx

User 8

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol?
Based on the symbols you saw on the nearby
computer and informational poster, please draw a
line connecting each category to a symbol using
your best guess.

DNA Recovery	Warrant
Homicide	Narcotics
Shoeprint	Burglary
Missing Person	Haz-Mat
Assault	Arson
Mentally Ill	Abandoned Car
Person Located	Fire
Suicide	Amber Alert
Speeding	Trail Lost
Arrest	Shoplifting
Call Heard	Car Accident
911 Call	Clue Found
	Trail Found

Based on what you read about the functionality
on the nearby poster, can you tell the time when
the following events happened? Please circle
your best guess.

A	12pm - 3pm		A	12pm - 6pm
B	3pm - 12am		B	6am - 12pm
C	12pm - 3am		C	12am - 6am
D	3pm - 12pm		D	6am - 12am

User 8

Community Crime Mapping   *User Survey 2015*

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

(A)	12pm - 3pm	
B	3am - 12am	
C	12am - 3am	
D	3am - 12pm	

A	3pm - 6pm & 9pm - 12am	
(B)	9pm - 12am & 3pm - 6pm	
C	9am - 12pm & 3pm - 6pm	
D	12pm - 3pm & 6pm - 9pm	

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☑

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?   Yes ☐   No ☑

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☐   No ☑

If yes, please specify your experience?

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☑ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☐ ☐ ☑ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   Mostly Sure   (Very Sure)   100% Sure

Any further comments about the design or project in general?

User 9

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery
Homicide
Shoeprint
Missing Person
Assault
Mentally Ill
Person Located
Suicide
Speeding
Arrest
Call Heard
911 Call

Warrant
Narcotics
Burglary
Haz-Mat
Arson
Abandoned Car
Fire
Amber Alert
Trail Lost
Shoplifting
Car Accident
Clue Found
Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A 12pm - 3pm
B 3pm - 12am
C 12pm - 3am
D 3pm - 12pm

A 12pm - 6pm   6pm - Friday
B 6am - 12pm
C 12am - 6am
D 6am - 12am

User 9

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm
B	3am - 12am
C	12am - 3am
D (circled)	3am - 12pm

A	3pm - 6pm & 9pm - 12am
B	9pm - 12am & 3pm - 6pm
C	9am - 12pm & 3pm - 6pm
D (circled)	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing? Yes ☐   No ☑

If yes, to what capacity are you familiar? Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping? Yes ☐   No ☑

If yes, to what capacity are you familiar? Some ☐ ☐ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies? Yes ☐   No ☑

If yes, please specify your experience?

Please rate overall design of the symbol collection. Poor ☐ ☐ ☐ ☑ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling) Simple ☐ ☐ ☑ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice) Not Sure   Mostly Sure   (Very Sure)   100% Sure

Any further comments about the design or project in general?

User 10

Community Crime Mapping   User Survey 2015

**Can you match the correct category and symbol?
Based on the symbols you saw on the nearby
computer and informational poster, please draw a
line connecting each category to a symbol using
your best guess.**

DNA Recovery

Homicide

Shoeprint

Missing Person

Assault

Mentally Ill

Person Located

Suicide

Speeding

Arrest

Call Heard

911 Call

Warrant

Narcotics

Burglary

Haz-Mat

Arson

Abandoned Car

Fire

Amber Alert

Trail Lost

Shoplifting

Car Accident

Clue Found

Trail Found

**Based on what you read about the functionality
on the nearby poster, can you tell the time when
the following events happened? Please circle
your best guess.**

A	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
B	6am - 12pm
C	12am - 6am
D	6am - 12am

User 10

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	
B	3am - 12am	
C	12am - 3am	
D	3am - 12pm	(circled)

A	3pm - 6pm & 9pm - 12am	
B	9pm - 12am & 3pm - 6pm	
C	9am - 12pm & 3pm - 6pm	
D	12pm - 3pm & 6pm - 9pm	(circled)

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☑   No ☐

If yes, to what capacity are you familiar?   Some ☐ ☑ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?   Yes ☐   No ☑

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☐   No ☑

If yes, please specify your experience?

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☑ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☐ ☐ ☑ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   Mostly Sure   Very Sure   (100% Sure)

Any further comments about the design or project in general?

User 11

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol?
Based on the symbols you saw on the nearby
computer and informational poster, please draw a
line connecting each category to a symbol using
your best guess.

DNA Recovery

Homicide

Shoeprint

Missing Person

Assault

Mentally Ill

Person Located

Suicide

Speeding

Arrest

Call Heard

911 Call

Warrant

Narcotics

Burglary

Haz-Mat

Arson

Abandoned Car

Fire

Amber Alert

Trail Lost

Shoplifting

Car Accident

Clue Found

Trail Found

Based on what you read about the functionality
on the nearby poster, can you tell the time when
the following events happened? Please circle
your best guess.

A	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
B	6am - 12pm
C	12am - 6am
D	6am - 12am

User 11

Community Crime Mapping   *User Survey 2015*

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	
B	3am - 12am	
C	12am - 3am	
D	3am - 12pm	(circled)

A	3pm - 6pm & 9pm - 12am	
B	9pm - 12am & 3pm - 6pm	
C	9am - 12pm & 3pm - 6pm	
D	12pm - 3pm & 6pm - 9pm	(circled)

Law Enforcement Knowledge

Are you at all familiar with predictive policing?	Yes	☑		No	☐		
If yes, to what capacity are you familiar?	Some	☐	☑	☐	☐	☐	Experienced
Are you at all familiar with crime mapping?	Yes	☑		No	☐		
If yes, to what capacity are you familiar?	Some	☐	☑	☐	☐	☐	Experienced
Do you work for or have you worked with any form of law enforcement agencies?	Yes	☐		No	☑		

If yes, please specify your experience?

Please rate overall design of the symbol collection.	Poor	☐	☐	☐	☑	☐	Well Done
Please rate overall comprehension of the system mechanics. (Time Telling)	Simple	☐	☐	☐	☑	☐	Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)

Not Sure   Mostly Sure   (Very Sure)   100% Sure

Any further comments about the design or project in general?

User 12

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery	Warrant	
Homicide	Narcotics	
Shoeprint	Burglary	
Missing Person	Haz-Mat	
Assault	Arson	
Mentally Ill	Abandoned Car	
Person Located	Fire	
Suicide	Amber Alert	
Speeding	Trail Lost	
Arrest	Shoplifting	
Call Heard	Car Accident	
911 Call	Clue Found	
	Trail Found	

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	A	12pm - 6pm
B	3pm - 12am	B	6am - 12pm
C	12pm - 3am	C	12am - 6am
D	3pm - 12pm	D	6am - 12am

User 12

Community Crime Mapping User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	
B	3am - 12am	
C	12am - 3am	
D	3am - 12pm	(circled)

A	3pm - 6pm & 9pm - 12am	
B	9pm - 12am & 3pm - 6pm	
C	9am - 12pm & 3pm - 6pm	
D	12pm - 3pm & 6pm - 9pm	

Law Enforcement Knowledge

Are you at all familiar with predictive policing? Yes ☐   No ☑

If yes, to what capacity are you familiar? Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping? Yes ☑   No ☐

If yes, to what capacity are you familiar? Some ☐ ☑ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies? Yes ☐   No ☑

If yes, please specify your experience?

Please rate overall design of the symbol collection. Poor ☐ ☐ ☐ ☑ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling) Simple ☑ ☐ ☐ ☐ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice) Not Sure   Mostly Sure   (Very Sure)   100% Sure

Any further comments about the design or project in general?

User 13

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol?
Based on the symbols you saw on the nearby
computer and informational poster, please draw a
line connecting each category to a symbol using
your best guess.

	DNA Recovery			Warrant	
	Homicide			Narcotics	
	Shoeprint			Burglary	
	Missing Person			Haz-Mat	
	Assault			Arson	
	Mentally Ill			Abandoned Car	
	Person Located			Fire	
	Suicide			Amber Alert	
	Speeding			Trail Lost	
	Arrest			Shoplifting	
	Call Heard			Car Accident	
	911 Call			Clue Found	
				Trail Found	

Based on what you read about the functionality
on the nearby poster, can you tell the time when
the following events happened? Please circle
your best guess.

NOON

	A	12pm - 3pm
	B	3pm - 12am
	C	12pm - 3am
	D	3pm - 12pm

	A	12pm - 6pm
	B	6am - 12pm
	C	12am - 6am
	D	6am - 12am

6AM → 1

User 13

Community Crime Mapping   *User Survey 2015*

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

	A	12pm - 3pm
	B	3am - 12am
	C	12am - 3am
	(D)	3am - 12pm

	A	3pm - 6pm & 9pm - 12am
	B	9pm - 12am & 3pm - 6pm
	C	9am - 12pm & 3pm - 6pm
	(D)	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☑

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?   Yes ☐   No ☑

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☐   No ☑

If yes, please specify your experience?

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☐ ☑ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☐ ☑ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   Mostly Sure   (Very Sure)   100% Sure

Any further comments about the design or project in general?

User 14

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol?
Based on the symbols you saw on the nearby
computer and informational poster, please draw a
line connecting each category to a symbol using
your best guess.

Based on what you read about the functionality
on the nearby poster, can you tell the time when
the following events happened? Please circle
your best guess.

(A)	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
(B)	6am - 12pm
C	12am - 6am
D	6am - 12am

User 14

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	
B	3am - 12am	
C	12am - 3am	
(D)	3am - 12pm	

A	3pm - 6pm & 9pm - 12am
B	9pm - 12am & 3pm - 6pm
C	9am - 12pm & 3pm - 6pm
(D)	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?	Yes ☐	No ☒	
If yes, to what capacity are you familiar?	Some ☐ ☐ ☐ ☐ ☐		Experienced
Are you at all familiar with crime mapping?	Yes ☐	No ☒	
If yes, to what capacity are you familiar?	Some ☐ ☐ ☐ ☐ ☐		Experienced
Do you work for or have you worked with any form of law enforcement agencies?	Yes ☐	No ☒	

If yes, please specify your experience?

Please rate overall design of the symbol collection.	Poor ☐ ☐ ☐ ☐ ☒	Well Done
Please rate overall comprehension of the system mechanics. (Time Telling)	Simple ☒ ☐ ☐ ☐ ☐	Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)

Not Sure   Mostly Sure   (Very Sure)   100% Sure

Any further comments about the design or project in general? *Good Job!*

User 15

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery	Warrant
Homicide	Narcotics
Shoeprint	Burglary
Missing Person	Haz-Mat
Assault	Arson
Mentally Ill	Abandoned Car
Person Located	Fire
Suicide	Amber Alert
Speeding	Trail Lost
Arrest	Shoplifting
Call Heard	Car Accident
911 Call	Clue Found
	Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

	A	12pm - 3pm		A	12pm - 6pm
	B	3pm - 12am		B	6am - 12pm
	C	12pm - 3am		C	12am - 6am
	D	3pm - 12pm		D	6am - 12am

User 15

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

	A	12pm - 3pm
	B	3am - 12am
	C	12am - 3am
	(D)	3am - 12pm

	A	3pm - 6pm & 9pm - 12am
	B	9pm - 12am & 3pm - 6pm
	C	9am - 12pm & 3pm - 6pm
	(D)	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☑

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?   Yes ☐   No ☑

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☐   No ☑

If yes, please specify your experience?

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☑ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☐ ☐ ☑ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   (Mostly Sure)   Very Sure   100% Sure

Any further comments about the design or project in general?

User 16

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol?
Based on the symbols you saw on the nearby
computer and informational poster, please draw a
line connecting each category to a symbol using
your best guess.

DNA Recovery

Homicide

Shoeprint

Missing Person

Assault

Mentally Ill

Person Located

Suicide

Speeding

Arrest

Call Heard

911 Call

Warrant

Narcotics

Burglary

Haz-Mat

Arson

Abandoned Car

Fire

Amber Alert

Trail Lost

Shoplifting

Car Accident

Clue Found

Trail Found

Based on what you read about the functionality
on the nearby poster, can you tell the time when
the following events happened? Please circle
your best guess.

A	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
B	6am - 12pm
C	12am - 6am
D	6am - 12am

User 16

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

		A	12pm - 3pm
		B	3am - 12am
		C	12am - 3am
		(D)	3am - 12pm

		A	3pm - 6pm & 9pm - 12am
		B	9pm - 12am & 3pm - 6pm
		C	9am - 12pm & 3pm - 6pm
		(D)	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☒

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐   Experienced

Are you at all familiar with crime mapping?   Yes ☐   No ☒

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐   Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☐   No ☒

If yes, please specify your experience?

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☐ ☒   Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☒ ☐ ☐ ☐   Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   Mostly Sure   Very Sure   (100% Sure)

Any further comments about the design or project in general?

User 17

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol?
Based on the symbols you saw on the nearby
computer and informational poster, please draw a
line connecting each category to a symbol using
your best guess.

| DNA Recovery |
| Homicide |
| Shoeprint |
| Missing Person |
| Assault |
| Mentally Ill |
| Person Located |
| Suicide |
| Speeding |
| Arrest |
| Call Heard |
| 911 Call |

| Warrant |
| Narcotics |
| Burglary |
| Haz-Mat |
| Arson |
| Abandoned Car |
| Fire |
| Amber Alert |
| Trail Lost |
| Shoplifting |
| Car Accident |
| Clue Found |
| Trail Found |

Based on what you read about the functionality
on the nearby poster, can you tell the time when
the following events happened? Please circle
your best guess.

(A)	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
(B)	6am - 12pm
C	12am - 6am
D	6am - 12am

User 17

Community Crime Mapping　　User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

	A	12pm - 3pm		A	3pm - 6pm & 9pm - 12am
	(B)	3am - 12am		B	9pm - 12am & 3pm - 6pm
	C	12am - 3am		C	9am - 12pm & 3pm - 6pm
	(D)	3am - 12pm		(D)	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?	Yes ☑		No ☐			
If yes, to what capacity are you familiar?	Some ☐	☑	☐	☐	☐	Experienced
Are you at all familiar with crime mapping?	Yes ☑		No ☐			
If yes, to what capacity are you familiar?	Some ☐	☑	☐	☐	☐	Experienced
Do you work for or have you worked with any form of law enforcement agencies?	Yes ☐		No ☑			

If yes, please specify your experience?

Please rate overall design of the symbol collection.	Poor ☐	☐	☐	☐	☑	Well Done
Please rate overall comprehension of the system mechanics. (Time Telling)	Simple ☐	☐	☐	☑	☐	Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)　　Not Sure　　Mostly Sure　　Very Sure　　(100% Sure)

Any further comments about the design or project in general?

> – Good Icon set and system
> – Clear Information
> – Great real-world potential

User 18

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol?
Based on the symbols you saw on the nearby
computer and informational poster, please draw a
line connecting each category to a symbol using
your best guess.

DNA Recovery	Warrant
Homicide	Narcotics
Shoeprint	Burglary
Missing Person	Haz-Mat
Assault	Arson
Mentally Ill	Abandoned Car
Person Located	Fire
Suicide	Amber Alert
Speeding	Trail Lost
Arrest	Shoplifting
Call Heard	Car Accident
911 Call	Clue Found
	Trail Found

Based on what you read about the functionality
on the nearby poster, can you tell the time when
the following events happened? Please circle
your best guess.

(A)	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
B	6am - 12pm
C	12am - 6am
(D)	6am - 12am

User 18

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	
(**B**)	3am - 12am	
C	12am - 3am	
D	3am - 12pm	

(**A**)	3pm - 6pm & 9pm - 12am
B	9pm - 12am & 3pm - 6pm
C	9am - 12pm & 3pm - 6pm
D	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☒

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?   Yes ☒   No ☐

If yes, to what capacity are you familiar?   Some ☐ ☐ ☒ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☒   No ☐

If yes, please specify your experience?   *Forensic Analysis of Film + Video*

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☐ ☒ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☐ ☐ ☐ ☒ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   Mostly Sure   Very Sure   (100% Sure)

Any further comments about the design or project in general?

User 19

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol?
Based on the symbols you saw on the nearby
computer and informational poster, please draw a
line connecting each category to a symbol using
your best guess.

DNA Recovery

Homicide

Shoeprint

Missing Person

Assault

Mentally III

Person Located

Suicide

Speeding

Arrest

Call Heard

911 Call

Warrant

Narcotics

Burglary

Haz-Mat

Arson

Abandoned Car

Fire

Amber Alert

Trail Lost

Shoplifting

Car Accident

Clue Found

Trail Found

Based on what you read about the functionality
on the nearby poster, can you tell the time when
the following events happened? Please circle
your best guess.

A	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
B	6am - 12pm
C	12am - 6am
D	6am - 12am

User 19

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm
B	3am - 12am
C	12am - 3am
(D)	3am - 12pm

A	3pm - 6pm & 9pm - 12am
B	9pm - 12am & 3pm - 6pm
C	9am - 12pm & 3pm - 6pm
D	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☑

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?   Yes ☑   No ☐

If yes, to what capacity are you familiar?   Some ☑ ☐ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☐   No ☑

If yes, please specify your experience?

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☑ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☑ ☐ ☐ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)

Not Sure   (Mostly Sure)   Very Sure   100% Sure

Any further comments about the design or project in general?

User 20

Community Crime Mapping   User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery

Homicide

Shoeprint

Missing Person

Assault

Mentally Ill

Person Located

Suicide

Speeding

Arrest

Call Heard

911 Call

Warrant

Narcotics

Burglary

Haz-Mat

Arson

Abandoned Car

Fire

Amber Alert

Trail Lost

Shoplifting

Car Accident

Clue Found

Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
B	6am - 12pm
C	12am - 6am
D	6am - 12am

User 20

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	A	3pm - 6pm & 9pm - 12am
B	3am - 12am	B	9pm - 12am & 3pm - 6pm
C	12am - 3am	C	9am - 12pm & 3pm - 6pm
D	3am - 12pm	**D**	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☑

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?   Yes ☐   No ☑

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☐   No ☑

If yes, please specify your experience?

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☑ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☑ ☐ ☑ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   Mostly Sure   Very Sure   100% Sure
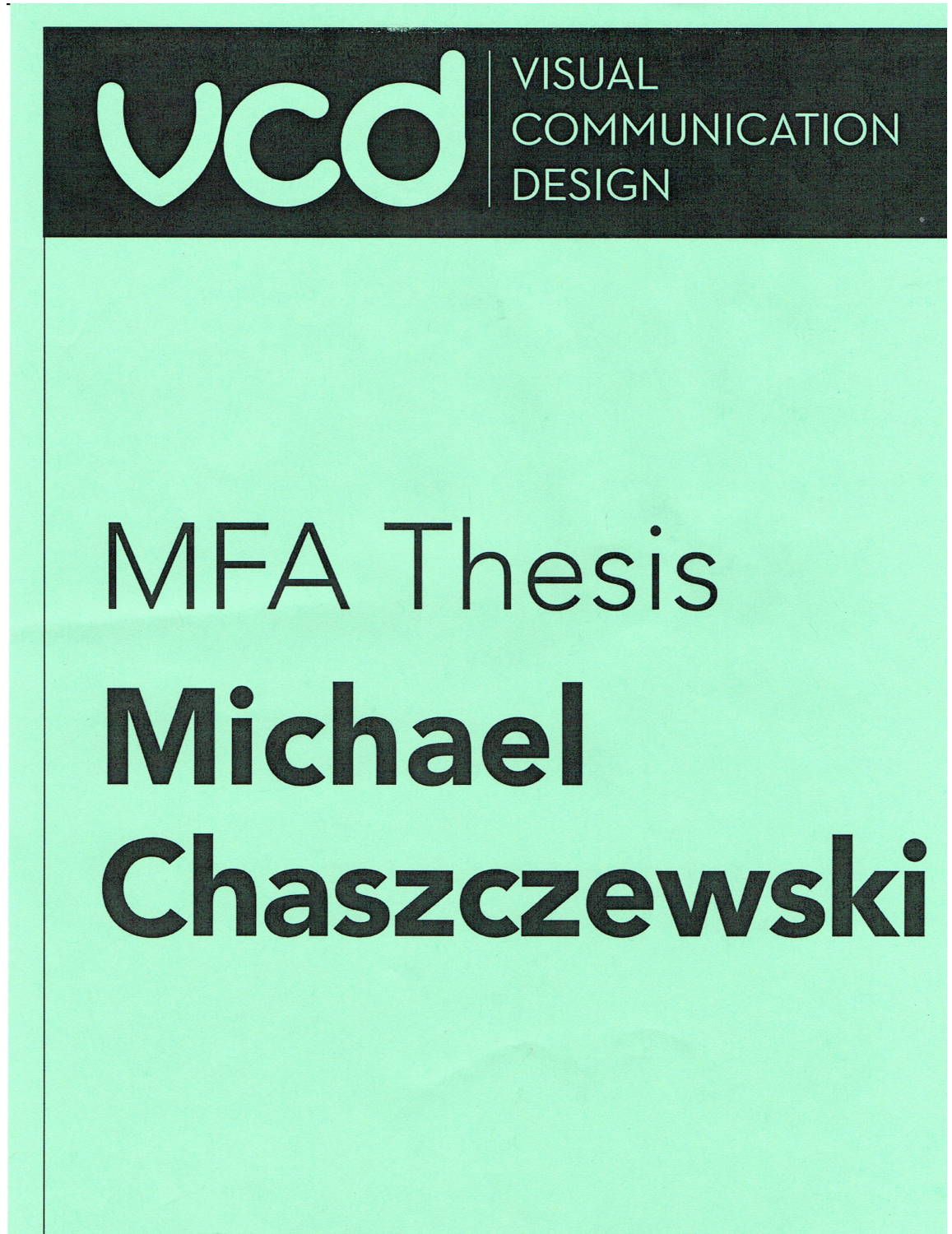
Any further comments about the design or project in general?

> It is hard for me to know the circle represents the time.

User 21

Community Crime Mapping

User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

DNA Recovery

Homicide

Shoeprint

Missing Person

Assault

Mentally Ill

Person Located

Suicide

Speeding

Arrest

Call Heard

911 Call

Warrant

Narcotics

Burglary

Haz-Mat

Arson

Abandoned Car

Fire

Amber Alert

Trail Lost

Shoplifting

Car Accident

Clue Found

Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A 12pm - 3pm
B 3pm - 12am
C 12pm - 3am
D 3pm - 12pm

A 12pm - 6pm
B 6am - 12pm
C 12am - 6am
D 6am - 12am

User 21

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm		A	3pm - 6pm & 9pm - 12am
B	3am - 12am		B	9pm - 12am & 3pm - 6pm
C	12am - 3am		C	9am - 12pm & 3pm - 6pm
D	3am - 12pm		D	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?	Yes ☐	No ☑	
If yes, to what capacity are you familiar?	Some ☐ ☐ ☐ ☐ ☐		Experienced
Are you at all familiar with crime mapping?	Yes ☐	No ☑	
If yes, to what capacity are you familiar?	Some ☐ ☐ ☐ ☐ ☐		Experienced
Do you work for or have you worked with any form of law enforcement agencies?	Yes ☐	No ☑	

If yes, please specify your experience?

Please rate overall design of the symbol collection.	Poor ☐ ☐ ☐ ☑ ☐		Well Done
Please rate overall comprehension of the system mechanics. (Time Telling)	Simple ☐ ☑ ☐ ☐		Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)

Not Sure   Mostly Sure ✓   Very Sure   100% Sure

Any further comments about the design or project in general?

User 22

Community Crime Mapping — User Survey 2015

Can you match the correct category and symbol? Based on the symbols you saw on the nearby computer and informational poster, please draw a line connecting each category to a symbol using your best guess.

Left column categories:
- DNA Recovery
- Homicide
- Shoeprint
- Missing Person
- Assault
- Mentally Ill
- Person Located
- Suicide
- Speeding
- Arrest
- Call Heard
- 911 Call

Right column categories:
- Warrant
- Narcotics
- Burglary
- Haz-Mat
- Arson
- Abandoned Car
- Fire
- Amber Alert
- Trail Lost
- Shoplifting
- Car Accident
- Clue Found
- Trail Found

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm
B	3pm - 12am
C	12pm - 3am
D	3pm - 12pm

A	12pm - 6pm
B	6am - 12pm
C	12am - 6am
D	6am - 12am

User 22

Community Crime Mapping   User Survey 2015

Based on what you read about the functionality on the nearby poster, can you tell the time when the following events happened? Please circle your best guess.

A	12pm - 3pm	
B	3am - 12am	
C (circled)	12am - 3am	
D	3am - 12pm	

A	3pm - 6pm & 9pm - 12am
B	9pm - 12am & 3pm - 6pm
C	9am - 12pm & 3pm - 6pm
D (circled)	12pm - 3pm & 6pm - 9pm

Law Enforcement Knowledge

Are you at all familiar with predictive policing?   Yes ☐   No ☒

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Are you at all familiar with crime mapping?   Yes ☐   No ☒

If yes, to what capacity are you familiar?   Some ☐ ☐ ☐ ☐ ☐ Experienced

Do you work for or have you worked with any form of law enforcement agencies?   Yes ☐   No ☒

If yes, please specify your experience?

Please rate overall design of the symbol collection.   Poor ☐ ☐ ☐ ☒ ☐ Well Done

Please rate overall comprehension of the system mechanics. (Time Telling)   Simple ☐ ☐ ☒ ☐ ☐ Complex

Do you feel you were able to identify most or all of the symbols with their correct categories? (Circle one choice)   Not Sure   Mostly Sure   Very Sure   (100% Sure)

Any further comments about the design or project in general?

Poster

Poster

Community Crime Mapping: Policing Symbols
A Thesis By: Michael Chaszczewski

Background

Crime prevention is an important area in the lives of citizens and police officers. Agencies like local police use strategic counter crime plans to tackle the urgency created everyday when crimes are committed. Crime mapping is one of the tools allowing officers to understand criminalistic data and map out crime routes to predict where the next crime may occur. This idea is called predictive policing.

Problem

- Crime mapping lacks a cohesive unified visual system.
- The breadth of symbols available is limited to specific crimes only.
- Crime mapping doesn't include other police activity such as field work, search and rescue efforts, and emergency response.
- The current system does not attempt to indicate when an event occurs.

Solution

- This thesis unifies the strategy with a series of standard icon sets that span crime, search and rescue, emergency and field activity categories.
- The icon system creates an easily sharable solution between departments.
- A flexible system showing data based on time of day and relative time period.

Function

The Outer circle represents relative time based on 4 three hour divisions equaling 12 hours in either AM or PM format. The **darker** sections of the ring indicate the time period and are read clockwise to relate to a clock in function.

Example

Homicide: AM

The inner circle shows the illustration as black on white for AM hours.

6 AM - 12 Noon

12 AM - 3 AM &
6 AM - 9 AM

Homicide: PM

The inner circle shows the illustration as white on black for PM hours.

3 PM

3 PM - 6 PM

Presentation

Presentation

Presentation

Presentation

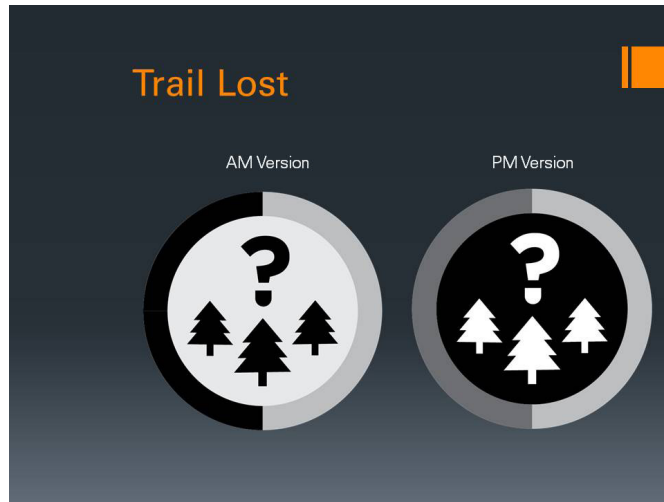*Presentation*

Presentation
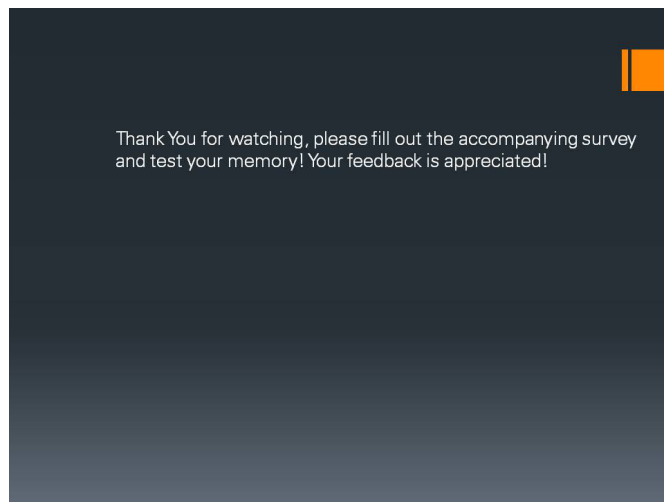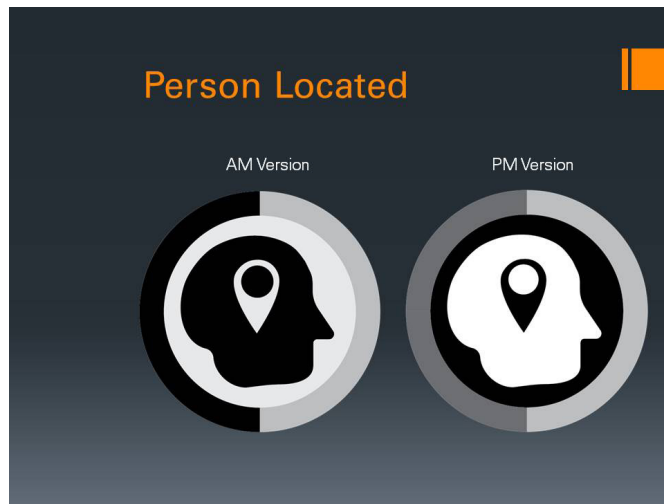
Presentation

Presentation

Presentation

Presentation

Presentation

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Community Crime Mapping

Increasing Predictive Policing with Dynamic Symbol Sets

Michael Chaszczewski

Community Crime Mapping

Increasing Predictive Policing with Dynamic Symbol Sets Manual
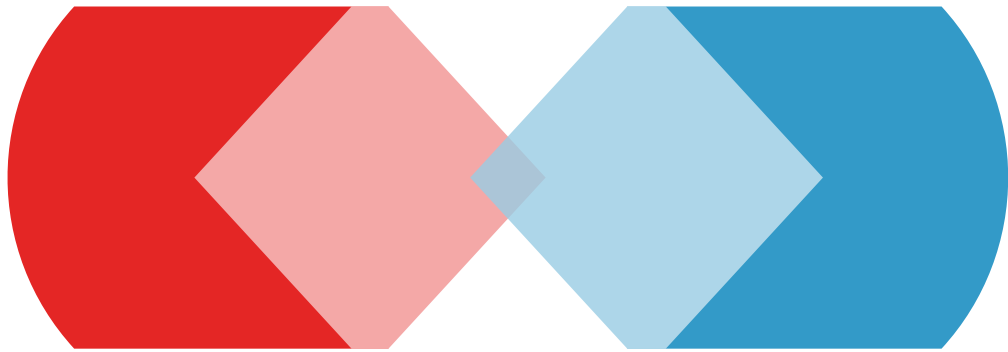
Michael G. Chaszczewski

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Introduction

Situation Analysis

Background

Crime prevention is an important area of study in our society as it plays an integral role in the lives of citizens and the officers who protect them from harm. Law enforcement agencies such as local police enlist the aid of strategic counter crime plans to tackle the overbearing urgency that is created everyday when crimes are committed. Crime mapping is one of these tools allowing officers to understand criminalistic data and map out crime routes, hot zones and predict where the next crime may occur. Through mapping spatial relationships of crime perpetrators and victims, predictable policing efforts can be put into effect that cut crime rates and help to better serve the community by policing areas that need it most. This mapping technique is also important in future efforts to catch perpetrators and solve crimes.

Problems

Current crime mapping techniques are meant to allow for law officers to gain a more complete understanding about the criminal activity that occurs along their patrols and an over arching view of their scope of jurisdiction. Mapping criminal activity is typically done at an individual agency level by crime analysts that relay the information to officers in the field. However, each department handles the data differently and analysts develop a symbol system tailored to their own interests.

Alternatively, many maps are developed with base ESRI crime symbols which are then modified for a specific department. Furthermore, analysts tend to assign colors to each crime category and thus further distances the overall system from itself and from systems in other departments across the country. Ergo, the crime prevention measures that should be derived from crime mapping become confusing and an array of issues still persist which include:

- A lack of a cohesive unified visual symbol system.

- No standardized system of color for crime categories.

- Disconnect between officers and analysts who may each misinterpret data.

- Disconnect between departments who need to share crime mapping data.

- The breadth of symbols available is limited to only crime.

- Crime mapping doesn't include other important and regular police activity such as field work, search and rescue efforts, and emergency response.

- The current system does not attempt to indicate when an event occurs either AM or PM and also a relative time period of an event occurrence.

Design
Solution

Resolution

A dynamic symbol solution system was developed to fill the gap in crime mapping by unifying the strategy with a series of standard icon system sets that span the breadth of law enforcement duties. It will increase the levels of communication by having changes to any given symbol based on time of day and a relative time period spanning three hour increments. To easily show this, the symbols are circular and directly relate to a clock in function.
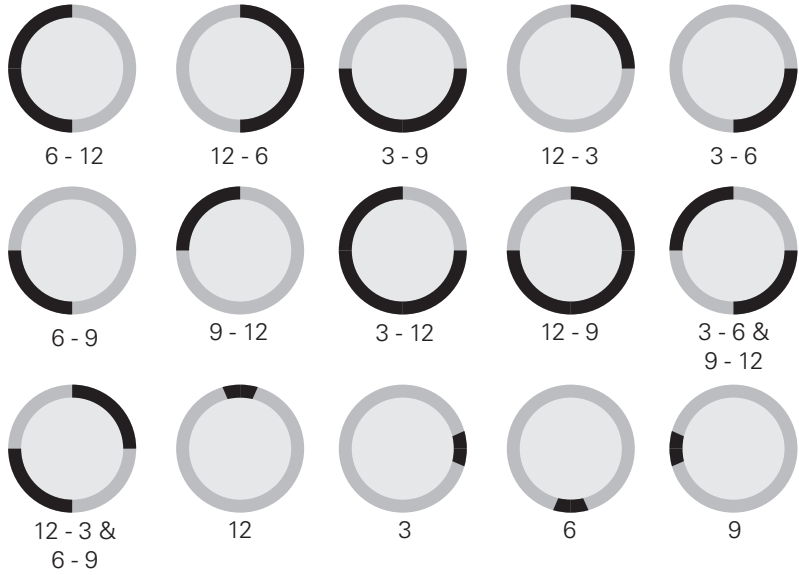
The resulting symbols allow crime maps to encompass all activities that police are involved with creating a more diverse and data rich design solution. Furthermore, the system as a whole will allow for cross communication between departments to be easier and more effective. An order and concise visual interpretation has been created and the solution remains void of color in place of a grayscale to keep the system whole and uniform across each application. When applying this system to a layered interactive map(ESRI ArcGis), officers can now focus on specific efforts that involve certain crime categories without an over abundance of information to decipher.
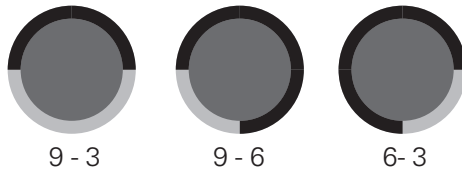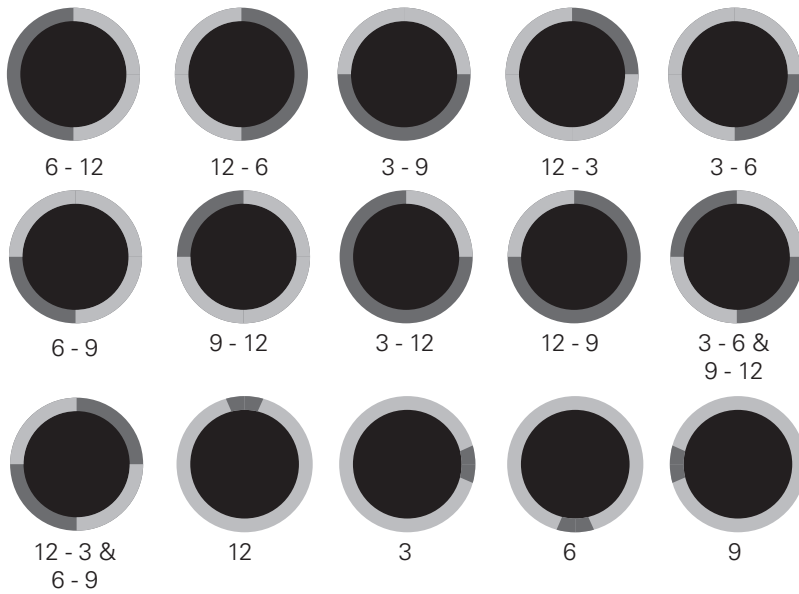
Time

Time Variations

AM Symbols

6 - 12	12 - 6	3 - 9	12 - 3	3 - 6

6 - 9	9 - 12	3 - 12	12 - 9	3 - 6 & 9 - 12

12 - 3 & 6 - 9	12	3	6	9

Transitional Symbols

9 - 3	9 - 6	6- 3

PM Symbols

6 - 12	12 - 6	3 - 9	12 - 3	3 - 6

6 - 9	9 - 12	3 - 12	12 - 9	3 - 6 & 9 - 12

|				
12 - 3 & 6 - 9	12	3	6	9

**Time
Function**

The Outer circle represents a relative time based on four, three hour time divisions equaling 12 hours in either AM or PM format. The **darker** sections of the ring indicate the time period and are read clockwise to relate to a clock in function and in aesthetics. Users start determining the time by reading the darkened area that comes first in a clockwise motion, always going forward.
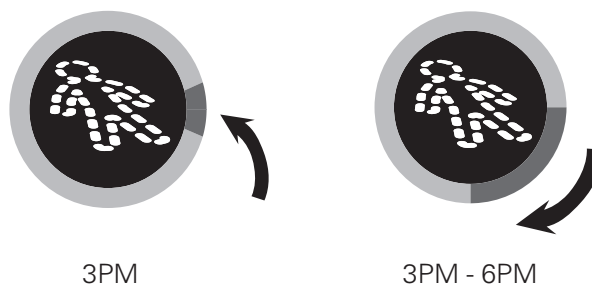
AM Symbols

AM Symbols

The inner circle shows the illustration as black on white for AM hours.

6AM - Noon

12AM - 3AM
& 6AM - 9AM
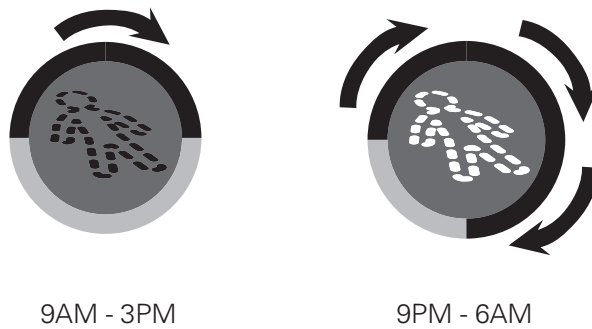
Transitional Symbols

The inner circle shows the illustration as white on gray for PM to AM and black on gray for AM to PM transitions.

9AM - 3PM

9PM - 6AM

PM Symbols

The inner circle shows the illustration as white on black for PM hours.

3PM

3PM - 6PM

Symbol
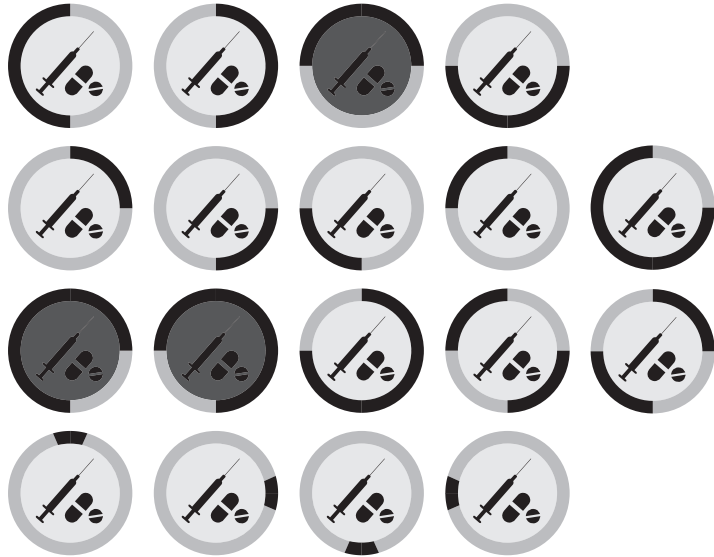## Collections

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AM Symbols

PM Symbols

Criminal Activity

Use of Narcotics

AM Symbols

The highest percentage of sales and manufacturing of narcotics was 21.8% in the northeast region of the US.
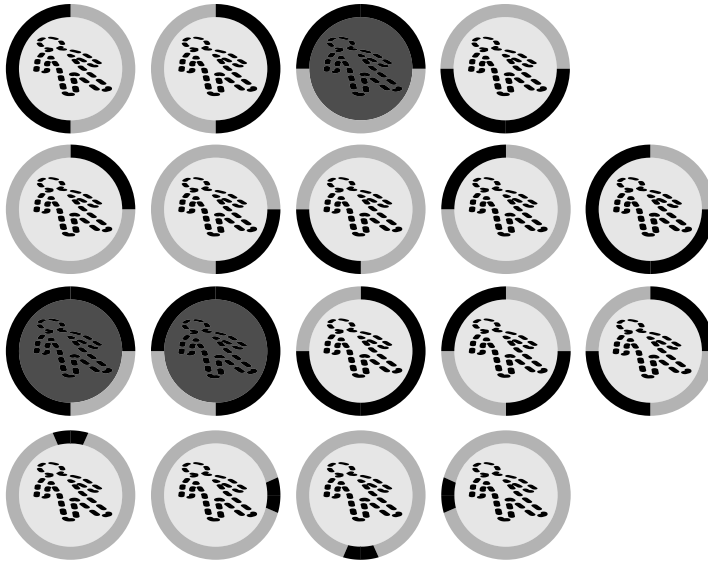
PM Symbols

Some of the street names of narcotics include black tar, hillbilly heroin, junk and oxy.

Act of Homicide

AM Symbols

According to the Uniform Crime Report there were 12,253 homicide victims in 2013.

PM Symbols

The number of homicides committed with a firearm in New York was 362 in 2013.

Act of Burglary

AM Symbols

59% of burglaries in the US, involved forcible entry in 2013.

PM Symbols

An estimated $4.5 billion in property losses due to burglaries occurred in 2013.

Act of Shoplifting

AM Symbols

More than 10 million shoplifters have been caught in the past 5 years.

PM Symbols

Thefts accounted for about 69% of property crimes in 2013.

Aggravated Assault

AM Symbols

There are two types of assaults; aggravated and simple assaults.

PM Symbols

There were 724,149 aggravated assaults in 2013.

Act of Arson

AM Symbols

The average dollar loss per arson was $14,390 in 2013.

PM Symbols

Nationwide, there were 16 arson offenses per every 100,000 citizens in the US in the year of 2013.

Crime
Collection

AM Symbols

PM Symbols

Field Activity

Speeding Stop

AM Symbols

In 2012, there were 33,561 fatalities related to speeding in the USA.

PM Symbols

Young males are the most likely to be involved in a crash due to speeding.

Warrant Served

AM Symbols

A warrant requires probable cause to be issued by a judge.

PM Symbols

A warrant can be issued for the seizure of evidence or of a person.

Abandoned Vehicle

AM Symbols

Abandoned vehicles can be found in a variety of places including rural and urban areas.

PM Symbols

Condition, appearance and missing license plates contribute to a declaring a vehicle officially abandoned.

DNA Recovery

AM Symbols

Many cold cases have been solved with DNA that can now be analyzed.

PM Symbols

In most states, DNA is collected upon arrest of a suspect to be compared with DNA found at a scene.

Officer Arrest

AM Symbols

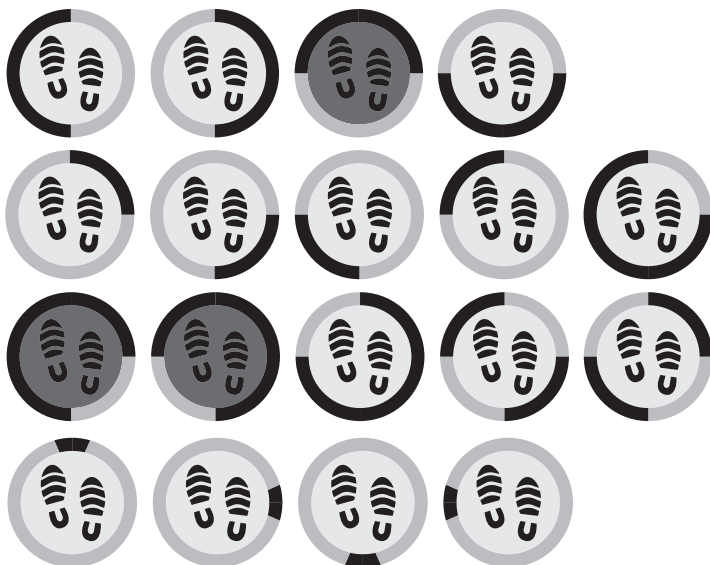The FBI compiles statistics on persons arrested based on age, gender and race.

PM Symbols

The total amount of arrests made in 2013 was 7,120,525 people.

AM Symbols

Some key
features
of shoeprints
include circles,
zigzags and
diamond marks.

PM Symbols

Different shoe
manufacturers
use the same
sole for different
shoe styles.

**Field
Collection**
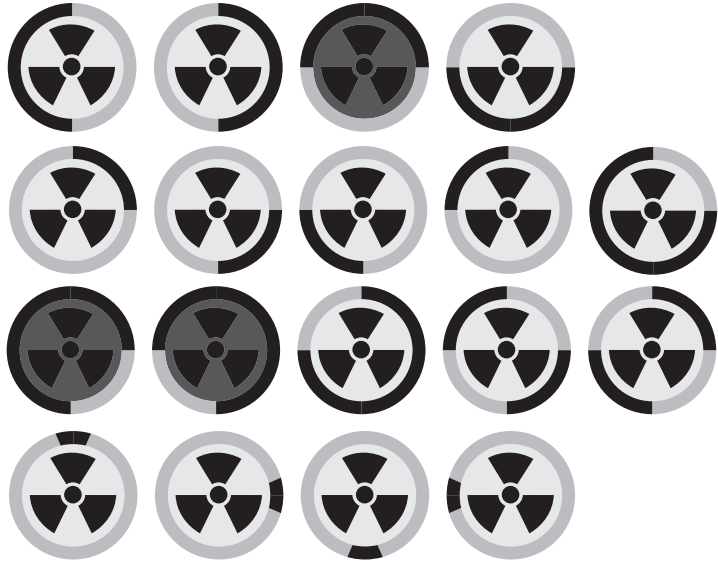
AM Symbols

PM Symbols

Emergency Response
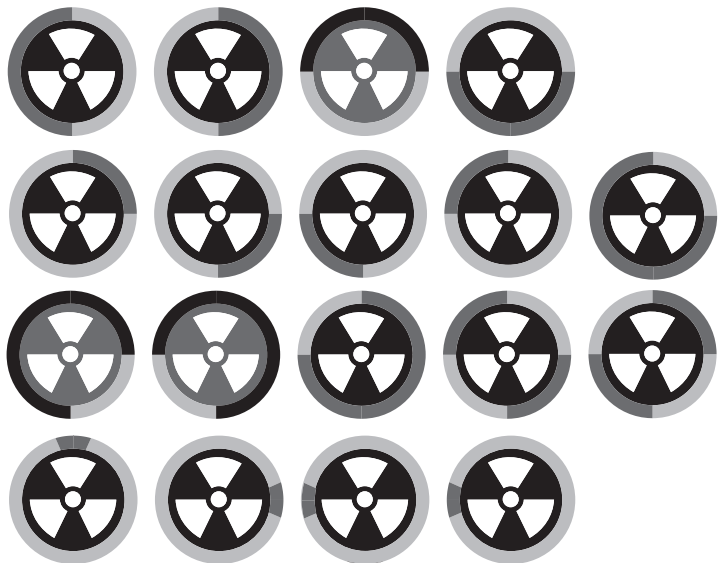
Hazardous Materials

AM Symbols

The FBI disperses the Hazardous Evidence Response Unit to respond to weapons of mass destruction threats and incidents.

PM Symbols

Hazardous materials include radiation, biochemical waste and explosives.

Car Accident

AM Symbols

In 2009, there were 10.8 million deaths related to car accidents.

PM Symbols

The largest proportion of deaths in single vehicle crashes occurred in Hawaii and in Montana.

**911
Call**

AM Symbols

An estimated
240 million calls
are made to
911 each year.

PM Symbols

When a call is
received, police,
EMT's or
firefighters are
dispatched
immediately.

Fire Response

AM Symbols

In the year 2011, $11.7 billion was lost due to fires.

PM Symbols

In 2011, there were 1,389,500 fires nationwide.

Mentally Ill Person

AM Symbols

56% of state prisoners and 45% of federal prisoners suffer from a mental illness disease.

PM Symbols

70% of mentally ill inmates are serving time for a nonviolent act or offense.

Suicide Response

AM Symbols
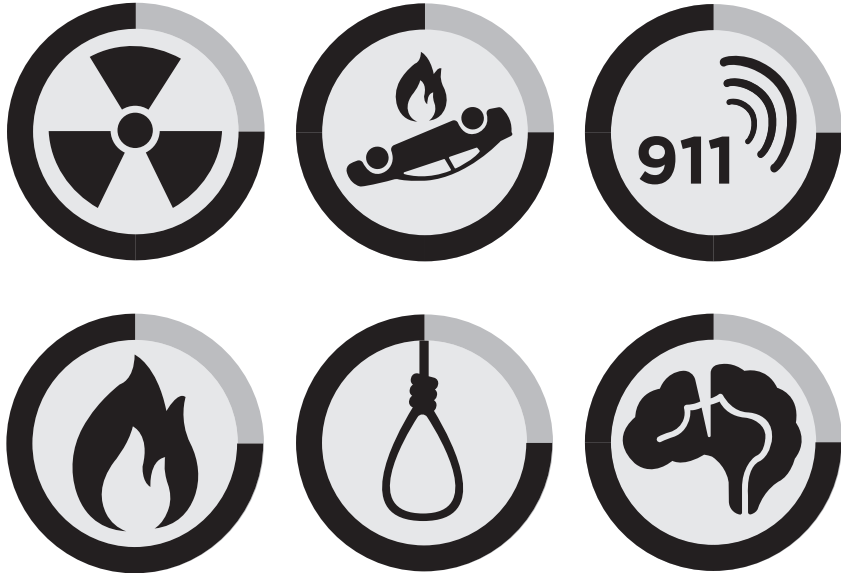
Suicide is the tenth leading cause of death in the USA.

PM Symbols

The 3 most common forms of suicide are gun inflicted, suffocation and poisoning.
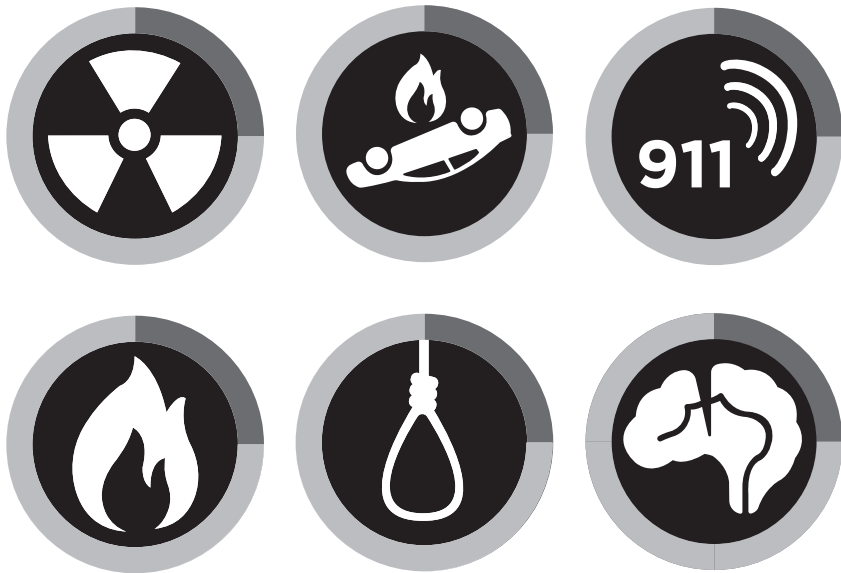
**Emergency
Collection**

AM Symbols

PM Symbols

Search and Rescue

Trail Lost

AM Symbols

A common cause for hikers who lose their trail is due to not being prepared with a headlamp at nightfall.

PM Symbols

Most hikers become lost trying to find a new view or shortcut back to their camp.

**Trail
Found**

AM Symbols

The National Park Service advises to always carry a headlamp, a whistle, and at least a warm jacket in the event of being forced to spend a night outdoors.

PM Symbols

Hiking, boating and swimming activities are the most common resulting in fatalities or in injuries.

Missing Person

AM Symbols

The National Crime Information Center's missing person file was implemented.

PM Symbols

In 2013, NCIC had 84,136 reported missing persons on file.

Person Located

AM Symbols

From 1992 to 2007 there were 78,488 individuals involved in 65,439 SAR incidents.

PM Symbols

These incidents ended with 2659 fatalities, 24,288 injured individuals, and 13,212 saves.

Call
Heard

AM Symbols

On average there are 11.2 SAR incidents each day at an average cost of $895 per operation.

PM Symbols

The NPS advises hikers always carry a whistle in case needed to help rescuers locate them.

Amber Alert

AM Symbols

There have been 758 successful recoveries because of amber alerts.

PM Symbols

In 2014, there were 466,949 entries of missing children under the age of 18 years into the National Crime Information Center.

Clue
Found

AM Symbols

Common clues
found are hairs,
fibers and shoe
impressions.

PM Symbols

A rule of thumb
for any crime
scene is that the
best evidence is
usually found at
the point of
greatest activity.

**SAR
Collection**

AM Symbols

PM Symbols

Conclusion

**AM Symbol
Sizes**

36 x 36px

**16 x 16px
Minimum Size**

PM Symbol Sizes

36 x 36px

**16 x 16px
Minimum Size**

**Final
Thoughts**

**Reflection
and Beyond**

This work strives both fill a gap in the realm of crime mapping but also to experiment with modes of data visualization via ideogramic symbols. It moves to question the usability of an icon and push its limits as a visual communication tool of quantitative data. The set is an abstraction of the breadth of work done each day by police officers and the analysts who relay information to them. The mechanics of the time telling coupled with ideograms of actions and situations relay multiple layers of information at a glance. Typically analysts don't bother to display crimes organized by time or on a constant basis. Crime maps tend to be developed on a longer time scale of weekly or monthly and that's where this thesis benefits in that it gives officers a mode of attaining vital information on a developing daily basis. These symbols question the paradigm of how crime mapping is carried out and how said maps are displayed. Because of their dynamic nature and the overall flexibility of telling time of events on two layer of a relative time period and AM/PM cycle, these symbols become a time based tactical analysis tool. They have great influence being shown on a daily report of events or daily update for each change in the shifts of officers each day to allow them the ability to see all that has happened daily. Officers tend to not gain this information and only have direct connections and knowledge of crimes or events that happen during their individual shift.

This work shows new avenues of exploration for symbol development and allows for a conversation and influence into adaptable dynamic symbol systems. They raise questions into the filed of data visualization and infographics by combining systems into one cohesive language of pictorial thought. A dynamically changing symbol set as this begs the question of what else is possible? It also questions the extent of what makes up a graphic symbol and why sets cannot do more to increase a data rich solution? This system becomes a tactical problem oriented policing tool that is effective, innovative and helpful to make officers, citizens and communities safer.

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Colophon

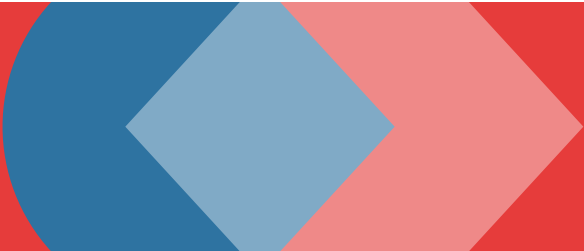|	
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