BCP56

Disaster Prediction and Crime Prevention using Geographic Information Systems

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Introduction - The Problem

Maintaining effective Law and Order in an ever developing metropolitan city like Bengaluru is a demanding task, but with the effective use of 21st century technology and the expertise of dispatchers and first responders (Police, Emergency Medical Services, Fire and Emergency Service) any intricate task can be solved.

The problem with present day systems is that they are outdated and do not make use of modern technology to help enhance the work of operators and first responders. The police take a lot of time to arrive on scene of the crime due to old fashioned dispatch methods. BCP56 will help reinvent public safety platform applications to give the operators and first responders the software they need and deserve.

Today police units responding to potentially very dangerous situations go in without any prior information and situational awareness. The Emergency call operators too do not have access to any information. Follow on police incident reports are all paper based and not integrated into a network.

With the help of basic Computer Aided Dispatch software and an Incident Records Management System everyday police operations and emergency call dispatch can be very effective to handle all the needs of the police department.

Existing system

Emergency call operators receive calls and then dispatches police units from Bengaluru Police Headquarters or they call the nearest district police station (to the incident) and then a police unit is dispatched to the scene of the crime. Hence there is critical time lost until the first unit is dispatched to the scene of the crime and they have zero situational awareness when responding to an incident. If an incident report needs to filed the paperwork will be done at the police station.

Proposed Solution

BCP56 is a a full feature public safety platform which connects all of the information of the Police department to the dispatchers and first responders with the help of a Records management system (RMS) and then helps them to take the best course of action with the help of a Computer aided dispatch system (CAD).

BCP56 will help Emergency Call operators manage all police units on patrol in the field effectively with a map based view of all police units and events with the help of Geographic information systems (GIS) and GPS . All events and calls are time logged hence ease of report generation.When a call is received the Emergency call operators will dispatch the nearest unit to the location and send constant information updates to the police units. The police units will be able to use the software to generate incident reports on site through the application instantly. Hence this software will help seamlessly integrate Emergency call operators and police units to give them all the necessary mission critical information and then help generate follow on incident reports on site through the application instantly.

With the use of GIS mapping solutions and GPS tracking of police units the software will feature a complete map based view of Bengaluru city updated to the latest information on road infrastructure and building plans (if available for government buildings). The Emergency call operators and police units in the field will have real time access to all of the information available on the platform. When police units arrive on scene of the crime they will have access to prior criminal record and additional information can be through Aadhar verification. If an incident report needs to be filed they can do so on spot or request additional police units if required.

The pros -
- Instant update of information so that critical response time is not lost.
- Paper free incident report generation.
- Helps to easily manage case files and incident reports by storing them in a categorical manner so that they can be accessed instantly when required from anywhere.
- Future proof system which can be scaled to handle all the needs of the police department from live video surveillance to crime analysis.

The problem -
- Information from the records should be secure.

The solution - Network Administrator who controls -
- IP address whitelisting/blacklisting
- Access to full event logs

Computer Aided Dispatch

A live network that allows emergency response units to have more intelligence about the crime scene during dispatch.

The system leverages all the information from the public safety platform to give Emergency call operators and Police unit/First responders the necessary information.

There's no reason for first responders to enter dangerous situations when critical information about a person or location can be at their disposal.

The software will be an all in one communications system which integrates voice,text and data in real time between Emergency operators and Police units.

The Emergency call operators will have real time access to the location of all police units and their current status in a map based view. When a call is placed the Emergency call operators can dispatch the nearest police unit to the location. The system forwards all the information of the surrounding area and information about the person who placed the call to the police units responding to the incident. The police will have enhanced situational awareness when responding to an incident.

Every incident report is recorded in the system to increase information gathering to predict pattern in crime occurrence and use Dijkstra's algorithm to find fastest route for police units.

If an ambulance(Emergency Medical Service) or a fire truck(Fire Department Service) needs to be dispatched to the location the Emergency call operator will direct the information the departments immediately in the system. The police units can update their current status and file follow on incident reports through the application to update the case file. All the incidents reports and calls flowing through the system will be time logged so that each and every case can be effectively stored in the system.
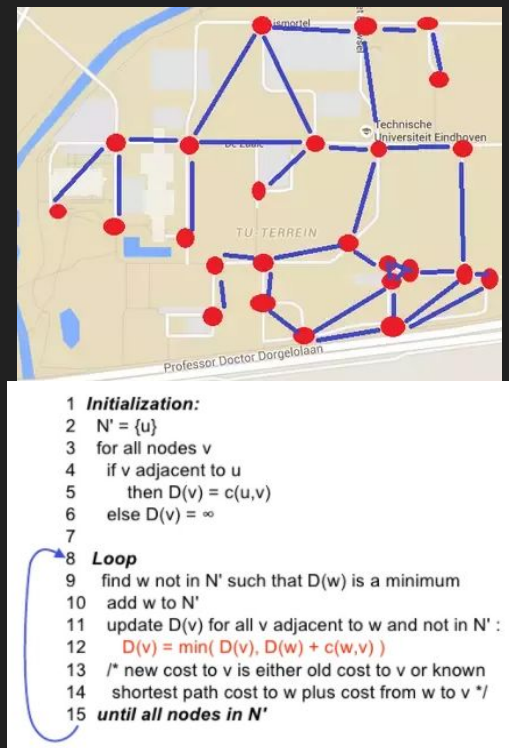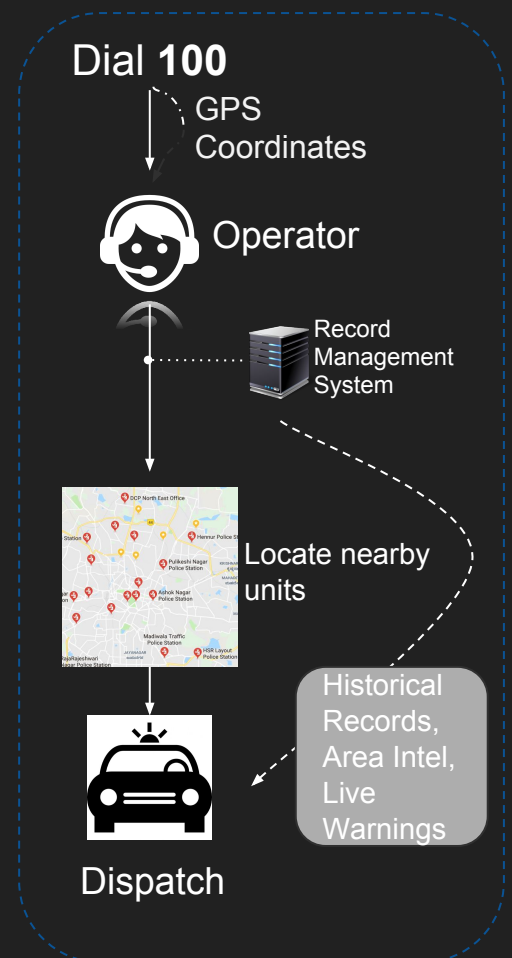


```
1  Initialization:
2    N' = {u}
3    for all nodes v
4      if v adjacent to u
5        then D(v) = c(u,v)
6      else D(v) = ∞
7
8  Loop
9    find w not in N' such that D(w) is a minimum
10   add w to N'
11   update D(v) for all v adjacent to w and not in N' :
12     D(v) = min( D(v), D(w) + c(w,v) )
13   /* new cost to v is either old cost to v or known
14   shortest path cost to w plus cost from w to v */
15  until all nodes in N'
```

Fig. Using Dijkstra's algorithm to find shortest dispatch route

Dial **100**
GPS Coordinates
Operator
Record Management System
Locate nearby units
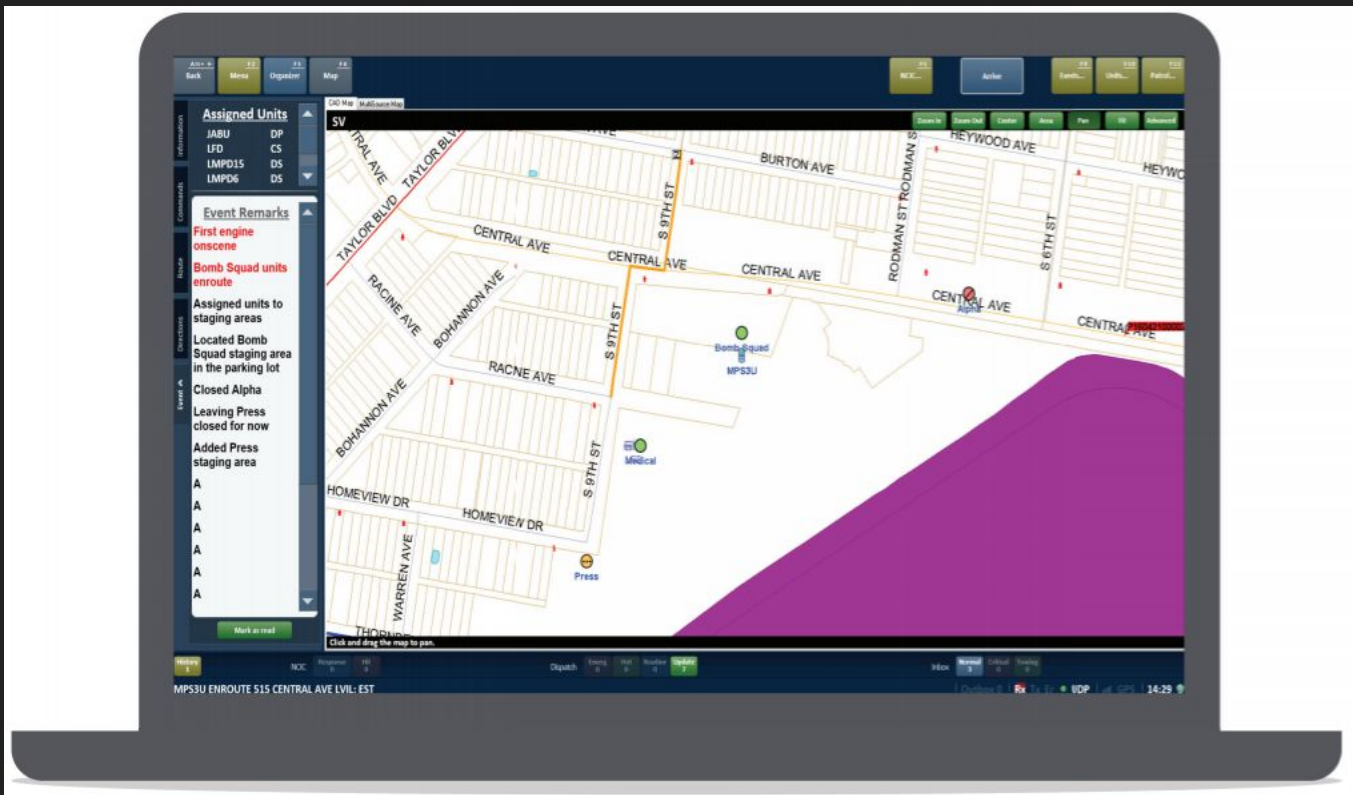Historical Records, Area Intel, Live Warnings
Dispatch

Fig: Mock representation running on mobile platform

Emergency Call Operator -

- Individual workstation setup with the fully integrated BCP56 Public safety platform application.

- Full capabilities for time logged call taking, dispatching and resource management.

- Multi layered AVL Map based views of calls,events and units.

- Real time video/audio/text chat.

Police Unit -

- Mobile dispatch capability on a laptop, smartphone or tablet.

- Multi layered AVL map view with closest events.

- Ease of incident report generation through the application.

- Prominent alert for new information.

- Real time video/audio/text chat.

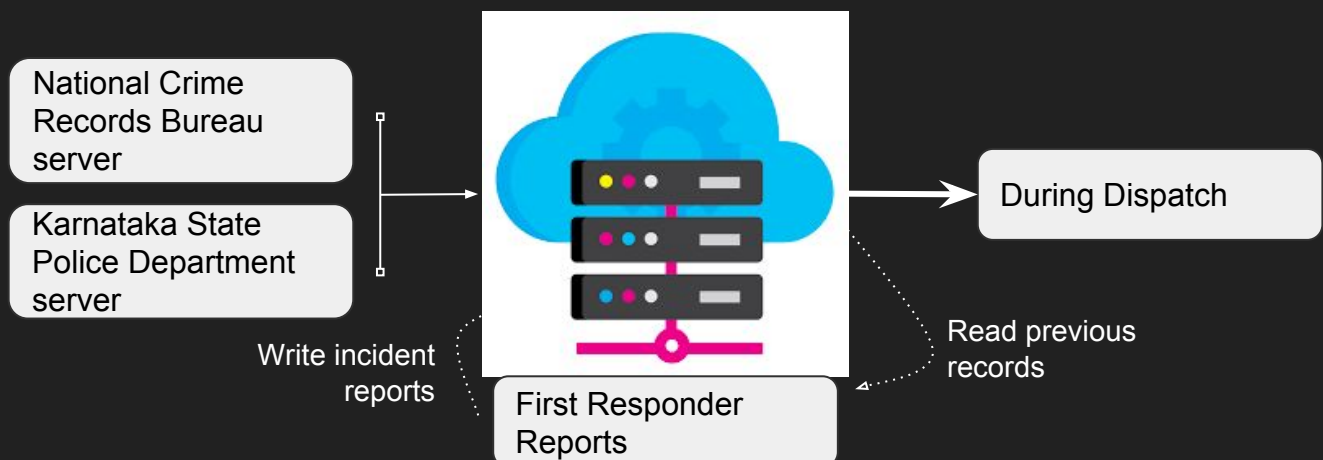# Records Management System

Fig. Record Management Data Flow

An integrated application that will help law enforcement data collection and management.

Report writing and record keeping is the most costly and time-consuming task for every police department. Creating paper based reports on time is a drain on manpower in terms of effort and budget.This system will not only help create real time digital records, but also store and retrieve them in a secure, timely manner while maintaining data integrity.

The records management system will help extend critical information to field personnel and supervisors.The BCP56 RMS system will be a cloud deployable enterprise information management system which gives quick access to data whenever and wherever it is needed.The system will be scalable for single and multi department use, it serves all departments of law enforcement operations and administration.

 Information and data access is critical and must be delivered in a timely and accurate fashion.To help field personnel/first responders they will be given real time access to BCP56 RMS in an easy to use application that can be accessed from any PC or tablet with the help of a secure browser based solution.

Fig: Representation of incident report generation

The main features of this system will include -

- Integration of multimedia,such as images and documents, resulting in higher level of information awareness resulting in faster identification and improved officer and citizen safety.

- Allows for ease of maintenance of evidence records and the complete chain of custody with electronic signatures and hence ensures that the data is secure and simplifies auditing and enables appropriate confidentiality(for juvenile cases).

- The system will have the capability to handle information from legacy systems of the Karnataka State police department and the National Crime Records Bureau (NCRB).

- Emergency call operators will have access to the public records of building layout and property owner from where the call was placed and will forward the relevant information to the dispatched police units.

- Police patrol units will also be able to access missing persons reports,active arrest warrants and previous criminal record (if any) at any time with a laptop or tablet and can generate incident reports on site instantly.

Best course for Implementation -

- The software will be installed on pre-existing government servers.
- The necessary training will be given to both the Emergency call operators and the police force so that they can easily use the application for their everyday use to enhance their operational effectiveness.
- The amount of financial resources required will be minimal since it is a software based solution which makes use of pre-existing computer systems and no additional hardware is required to be developed.

Impact of the solution -

- The time for police units to arrive on scene will drastically be reduced.
- The responding units will have additional situational awareness when going in to a crime scene.
- All records will be time logged so the reports cannot be modified after they have been published and hence information cannot be modified illegally after it has been published.
- Paper free report generation.
- Future proof system which will support body camera and dashboard camera footage from police units to record all incidents hence helps in the following court cases.

Response time

20mins   90mins

Report Generation time

40mins   120min

Future Upgrades -

Integration of Police body camera/dashboard camera -

Will be able to handle Live video feed from all police units on patrol from their body camera to help increase situational awareness and increase the information gathered for a particular incident.

Panic post -

Panic buttons can be installed in high crime areas which will directly alert the closest police unit and update Emergency operations centre .

Bengaluru City Police Public safety mobile application -

An Android/IOS mobile application for the public which will support live chat between an Emergency operator and the user. Anyone will be able to instantly send image or video file of a crime directly to an Emergency operator who can then forward the same information to the police units responding to the incident.