computer-aided dispatch
Ensuring a responsive public safety communications system

A Spillman Technologies Whitepaper
Introduction

In today’s world of public safety, the need for a computer-aided dispatch (CAD) system is a critical component in rapidly and efficiently responding to emergency situations. However, a CAD system is just one element in a public safety information system. It’s important that agencies understand how dispatch information will be used in daily operations and ensure that data is accessible from other system applications for a comprehensive and integrated public safety solution.

Whether used to dispatch law, fire, or EMS units, maintaining an effective, integrated CAD system can mean the difference between life and death. Dispatch agencies and communication centers require a CAD system that is reliable, configurable, and provides user-friendly tools for monitoring call status and dispatching and tracking units. The system must reduce response time and ensure the correct resources are on scene as quickly as possible, while taking into account the safety of responding units.

As communities grow, so does the need for interoperable systems that can communicate across jurisdictional boundaries. In these situations, consolidated communications centers require a responsive system that can integrate data between multiple system applications in addition to having the capacity to dispatch several agencies at once.

What is a CAD System?

A CAD system automates the process of dispatching calls for law, fire, EMS, and similar agencies. It is here that the initial contact information is entered into the records system and the call is assigned to a unit. In addition, the system displays the status of all open incidents and field personnel on duty, as well as provides a method to log times, addresses, complainants, and other significant call information.

Traditional CAD Components

The structure of a dispatch/communications center largely determines the hardware and software requirements to support a CAD system. The following elements are typically included in the system architecture:

- Workstations
  - Networked PCs
  - Multiple displays
Servers
Printers
E-911 controller
Software modules:
- Dispatching
- Mapping
- Alarm tracking and billing
- Persons, vehicles, and property records
- Geofile address verification
- Automatic Vehicle Locator
- Incident entry/management
- Traffic (citations, collisions, etc.)
- Personnel, training, and scheduling
- Activity logs
- Crime alerts, hot sheets
- Response plans
- Premises
- Hazardous materials
- Voiceless dispatch
- State and national queries
- Fire records
- EMS records
- Reports

Who Uses a CAD System?

Call Takers initiate calls for service by keying in detailed information from the caller. They often give pre-arrival instructions to the caller.

 Dispatchers send the appropriate unit assisted by the system’s automatic unit recommendation. From the CAD system, they access status updates of the call as it progresses. The dispatcher accesses the records management system (RMS) to provide field personnel with information that will enhance their safety. A dispatcher often locates the unit on a CAD map to visualize its position and may also query state or national databases for more RMS data.

 Field Personnel are assigned or dispatched to a call via radio or through a wireless mobile connection to the CAD system. They view the call details, location, and other critical data from their mobile screens and communicate with dispatch for further information.

Dispatch Supervisors monitor the entry of call information to ensure accurate and comprehensive data. They track the performance of dispatchers and call takers by reviewing the number of calls each employee has received. A supervisor also uses the information to determine if acceptable response times and call priorities are being met.

How Does a CAD System Work?

A computer-aided dispatch system substantially affects how efficiently emergency, fire, and law enforcement agencies operate.
Spillman Technologies: Computer-Aided Dispatch

- Information enters the system when a call taker or dispatcher receives a 911 call. E-911 ANI/ALI information automatically populates the CAD screen.
- Additional detailed call information is key-entered into the call record by the call taker or dispatcher.
- The CAD system helps the call taker verify the location of the call and the validity of the address using the Geofile.
- The system may consider any of the following criteria when recommending resources: location, nature, hazardous conditions, warrants, weapons, previous call history, and severity of the call. The dispatcher can accept, reject, or change the recommendation.
- While information is being gathered by the call taker, the dispatcher assigns resources to respond to the call.
- The CAD system aids the dispatcher in notifying resources of the call. For example, the system may page a fire station or send call data to a mobile unit over the radio. When mobile units are fully integrated with dispatch through a wireless connection, field personnel can view calls in real time as dispatch enters the call information.
- The dispatcher assigns the call to a field officer via a radio or “silently” using voiceless dispatch.
- Using time stamping, the CAD system records each step taken during the dispatch process. This becomes important when reporting dispatch activities and analyzing process improvement.
- The system tracks the location and duration of all unit resources. Pre-set timers can alert dispatchers to follow up with resources after specified periods of time.

**primary industry challenges**

Public safety agencies share many common concerns when developing and utilizing a CAD system. The following is a description of some of the key challenges that prevent agencies from achieving reliable and responsive CAD operations.

**Billing and Reporting for Services** – As more dispatching agencies consolidate to form larger dispatch centers that provide services for multiple jurisdictions, it becomes more difficult to manage the operational tasks of billing each agency and reporting to multiple administrators. Dispatch centers find that each agency requires unique statistical reports within distinct timelines. In addition, dispatch services must be tracked and calculated for each agency to generate a separate bill for services provided.

**Increased Responsibility** – The amount of responsibility a dispatcher has frequently increases when a consolidated dispatch center is formed. With the added number of jurisdictions and associated tasks, dispatchers must be able to handle higher call volumes at a more consistent rate. Moreover, they are often required to support additional agencies while other dispatch personnel are away from their workstations.

**Data Security** – Maintaining system boundaries while pooling resources with other agencies can be a challenging task for dispatch centers. Despite the cost savings of consolidated resources, agencies cannot always limit access to system data. A significant security risk exists if information is available to neighboring agencies or jurisdictions that could gain unauthorized access or modify critical data. Other security challenges exist as well. For example, the Health Insurance Portability and Accountability Act requires that agencies keep medical records private and secure. Communications centers are liable if unauthorized users can access the information, such as law enforcement accessing EMS records or vice versa.

**Cooperative Dispatch** – As a result of 9/11, public safety answering points (PSAPs) have combined efforts and resources to strengthen their capability to respond to catastrophic events. While this type of joint structure brings shared data benefits, a larger coverage area makes it more difficult for centers to effectively dispatch a unit from one jurisdiction to another.

**Address Verification** – Many dispatch personnel have a thorough understanding of local geography. This is valuable when choosing between two similar addresses generated by the system or assessing the unit location. While geographic familiarity is common for personnel in small dispatch centers or rural communities, it is less common in large centers where employee turnover is higher. Public safety agencies often struggle with finding technology that can take the place of inherent personnel knowledge.

Spillman’s Computer-Aided Dispatch solutions eliminate the obstacles that often prevent agencies from attaining reliable and responsive dispatch operations. Common CAD issues are solved through powerful system features and high-tech mechanisms.

**Quantifying Dispatch Services** – With Spillman’s flexible reporting structure, dispatch centers can compile a number of specialized reports for measuring communication activities and services. The reporting features allow agencies to export dispatch information into concise and thorough reports. Spillman’s CAD solutions can support virtually any reporting requirements from computing response times, radio logs, and address call histories, to figuring calls by date and time, call narratives, and more. Collectively, these customizable reports can simplify billing procedures by enabling agencies to precisely detail the dispatch services rendered while accommodating the requirements of multiple agencies.
Spillman Technologies: Computer-Aided Dispatch

- **Sustaining Increased Responsibility** – Multiple CAD screen capabilities allow dispatchers to multi-task within the Spillman system and assume additional responsibilities as needed. This is especially beneficial in a consolidated dispatch setting where dispatchers are regularly responsible for handling calls from more agencies or jurisdictions. Real-time status updates are also a significant benefit to these dispatchers because efficiency is an even greater priority. While operating Spillman CAD, dispatchers can view current call and unit activity and eliminate distracting screen clutter by displaying only the calls that occur in their areas or zones of responsibility. A view-only status screen also allows supervisors and others to monitor dispatch activities without adding, modifying, or deleting data. Command line entry also provides a fast method of entering unit status information and performing a number of routine tasks from the keyboard.

- **Securing Data** – Spillman CAD provides partitioning capabilities that separate responsibilities and assign dispatchers to a specific agency, giving dispatchers access to only the information they are responsible for. In addition to partitioning, permissions give dispatchers access to specific system functions. The goal is to keep information exact and prevent unintended modification after the call is closed.

- **Enabling Cooperative Dispatch** – Dispatchers can quickly determine which unit to dispatch to a particular location with Spillman CAD solutions. Using the Quickest Route feature in the CAD Mapping solution, dispatchers can accurately calculate the total drive time to reach a call, taking into account the agency’s local street network while recognizing barriers, such as rivers, canyons, and limited-access highways. Instead of dispatching by proximity only, actual drive time is calculated in order to recommend units that can arrive on scene first. CAD also displays the quickest route and driving directions for the dispatched unit. This feature is vital to communications centers that combine efforts and respond to multiple jurisdictions or cross regional boundaries.

- **Ensuring Address Verification** – In conjunction with the Geobase and CAD Mapping modules, Spillman’s CAD allows dispatchers to view the location and type of call along with unit location and status. Each time a call is entered in the system, the mapping application reads the information and a symbol appears on the map representing that call. This allows personnel to visualize relationships between all calls and units in the field. Geobase identifies precise locations by using common site names, alias location names, and a sounds-like spelling feature to pinpoint the exact site.

- **Master Tables**

  The foundation of the Spillman CAD system consists of master tables, which are sections of data grouped by relevance. Each table captures a particular set of information, organizes it into individual data fields, and makes it available to all other Spillman modules. Integration gives dispatchers direct access to essential data and builds secure and accurate call data. Spillman also provides an enhanced E-911 Interface that enables dispatch from multiple departments or jurisdictions. Using ANI/ALI technologies, CAD automatically displays the caller’s phone number and location. Integration with other Spillman solutions enables mapping and voiceless dispatch.

- **Integration**

  Spillman’s dispatch solutions offer complete system integration to facilitate efficient call taking and prompt dispatch response. Each module is connected through an open, centralized database where all information is stored. This integration puts information into the hands of everyone in the agency by integrating records, dispatch, mobile, and other applications into one shared system. From call receipt to close, call data is entered once and is automatically available throughout the system. Integration gives dispatchers direct access to essential data and builds secure and accurate call data. Spillman also provides an enhanced E-911 Interface that enables dispatch from multiple departments or jurisdictions. Using ANI/ALI technologies, CAD automatically displays the caller’s phone number and location. Integration with other Spillman solutions enables mapping and voiceless dispatch.

- **Involvements™**

  Spillman Involvements provide agencies with a powerful investigative tool by spanning all master tables and intuitively linking incidents, persons, vehicles, properties, and other records together as one. A dispatcher can have instant access to a person’s criminal history through a single name query. The system will notify dispatchers of alerts or warnings connected to that name. This functionality allows dispatchers to make quick, informed decisions and help protect field personnel. The Visual Involvements™ feature goes one step further by displaying linked data using an interactive, web-like structure that allows agencies to visualize relationships between data.
Reporting

Document dispatch activities with hundreds of preformatted reports provided in the Spillman system. Reports can also be customized to reflect operational needs. Advanced reporting tools allow consolidated dispatch centers to meet the reporting guidelines for each agency serviced.

Data Sharing

The Spillman system is constructed to unify all divisions throughout an agency and support regional data sharing with real-time data flow. Intra-agency sharing streamlines the exchange of information by connecting departments through fully integrated modules and immediate access to information. Using this technology, dispatch centers can share mission-critical information among all departments, such as law, fire, EMS, and corrections.

Software Modules

CAD

Agencies have the capability to manage call records from multiple agencies across multiple jurisdictions with Spillman’s CAD module. Real-time call updates, unit responses, and automatic alerts on wanted or missing persons are immediately accessible to agencies. The CAD module’s integration with CAD Mapping and the E-911 Interface allows agencies to increase efficiency by accurately identifying locations for responding officers and emergency personnel.

CAD Mapping

The CAD Mapping module displays visual information about an area, including street names, major buildings, landmarks, law enforcement districts, and fire/EMS zones on a map of the agency’s jurisdiction. The application allows a dispatcher to dispatch a unit to a call directly from the map by dragging and dropping the unit’s symbol over the call symbol. In addition, layers can be added to the map for multiple agency configurations.

E-911 Interface

The Spillman E-911 Interface receives ANI/ALI data from a standard E-911 system and automatically transmits the information to the computer-aided dispatch system. Used in conjunction with the CAD and CAD Mapping modules, the interface enables agencies to view real-time locations of both wireless and landline calls for service on a digital map.

Additional Modules

- Alarm Tracking & Billing
- Automatic Vehicle Locator (AVL)
- Premises & HazMat
- Response Plans
- Rip-n-Run
- State Link (State & National Queries)

GIS and Mobile Integration

Spillman’s Geobase module, a Geographical Information System (GIS), provides an integrated database of geo-referenced points. It creates a layered electronic map that contains detailed street and address information about a jurisdiction. The database displays specific addresses and intersections, including x- and y-coordinates, enabling dispatchers to rapidly identify correct locations including common location names and alternate or alias street names.

The Mobile AVL Mapping module uses Automatic Vehicle Location (AVL) technology to track the location of all fleet units through Global Positioning System (GPS) receivers. With AVL integration, dispatchers can recommend and select the unit that can respond fastest. Field personnel can also determine the shortest route to calls. Using AVL, the system can monitor and log where units have traveled. The Mobile Voiceless Dispatch module enables field officers to view calls in real time as dispatchers receive them.

Final Note

Public safety agencies need reliable software applications that simplify dispatching processes and provide user-friendly tools for tracking units and calls for law, fire, and EMS centers. In addition, many agencies need a responsive CAD system that can manage multiple jurisdictions by integrating data with other system applications. Consolidated dispatch centers require robust data integration, powerful searching capabilities, customizable reporting features, and unique investigative tools.

Spillman has developed the most comprehensive and powerful computer-aided dispatch system available, specifically addressing the needs of public safety agencies. Our priority is to research and design quality solutions that expand the scope of computer-aided dispatch, while providing our clients with versatility, ease of use, and peace of mind.
about spillman

Spillman meets the unique needs of virtually every public safety professional with a full suite of software solutions. The software is installed at approximately 600 agencies nationwide.