## Standard Functional Specifications for

# Law Enforcement Computer Aided Dispatch (CAD) Systems

Developed by the

**Law Enforcement Information Technology Standards Council (LEITSC)**

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# Acknowledgements

**Beverly Muse**
Technology Manager
City of Chattanooga (TN)

**Morris Roberson**
Postal Inspector (Retired)
U.S. Postal Service

**Jim Slater**
Chief Information Officer
Massachusetts Executive Office of Public Safety

**Mark Steigemeier**
Vice President
Motorola

**Darrell True**
IT Administrator
Wrentham (MA) Police Department

**Gary Vest**
Chief of Police
Powell (OH) Police Department

**Paul Wormeli**
Executive Director
IJIS Institute

## Advisors and Other Program Contacts

**William Cade, Jr.**
Director, 911 Services and Communications Operations
  Center
Association of Public Safety Communications Officials

**Joe Estey**
Chief of Police
Hartford (VT) Police Department
Former LEITSC Governance Member
IACP

**Joe Heaps**
Communications Technology Portfolio Manager
National Institute of Justice
Office of Justice Programs
U.S. Department of Justice

**Dustin Koonce**
Policy Advisor
Bureau of Justice Assistance
Office of Justice Programs
U.S. Department of Justice

**J. Patrick McCreary**
Associate Deputy Director
Bureau of Justice Assistance
Office of Justice Programs
U.S. Department of Justice

**Harlin McEwen**
Chief of Police (Retired)
Ithaca (NY) Police Department

**David Mulholland**
Lieutenant
U.S. Park Police
IACP

**Jennifer Zeunik**
Former LEITSC Project Manager (2002–2005)
IACP

## Project Manager

**Heather Ruzbasan**
LEITSC
International Association of Chiefs of Police
515 North Washington Street
Alexandria, VA 22314
(703) 836-6767, ext. 275
ruzbasan@theiacp.org
www.leitsc.org

## Special Thanks to Our Partners



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# Executive Summary: CAD

## History

The Law Enforcement Information Technology Standards Council (LEITSC) was created in 2002 with funding (Grant Number 2002-LD-BX-0002) from the U.S. Department of Justice, Bureau of Justice Assistance and continued in 2003 with funding (Grant Number 2003-MU-BX-0068) through a collaborative effort between the Bureau of Justice Assistance and the National Institute of Justice. LEITSC is currently funded under the Bureau of Justice Assistance (Grant Number 2003-MU-BX-0068) and continues to work in cooperation with the National Institute of Justice. LEITSC brings together representatives from the International Association of Chiefs of Police (IACP), National Sheriffs' Association (NSA), National Organization of Black Law Enforcement Executives (NOBLE), and Police Executive Research Forum (PERF) to address law enforcement information technology standards issues. The mission of the group is to foster the growth of strategic planning and implementation of integrated justice systems through the development and implementation of information technology standards.

## Purpose

In 2003, LEITSC identified the need for a national standard for computer aided dispatch (CAD) functional specifications. They believed that the standard would accomplish the following goals:

- Provide a starting point for law enforcement agencies to use when developing CAD requests for proposal (RFP);
- Level the playing field when working with vendors; and
- Promote system interoperability (for example, CAD to CAD).

With these goals in mind, the LEITSC Functional Standards Committee, composed of law enforcement practitioners and industry experts from around the country, was appointed to develop the Standard Functional Specifications for Law Enforcement CAD Systems. The baseline document was developed from common elements found in requests for proposals, technical documentation, and other CAD-related research. The document was then validated by the group using a modeling tool. Once developed and validated, the specifications were vetted through the law enforcement community via each of the participating associations, as well as through other stakeholder communities in an effort to gain input from a number of different perspectives.

## National Initiatives: Law Enforcement Information Sharing Program (LEISP), Law Enforcement National Data Exchange (N-DEx), and Law Enforcement Regional Data Exchange (R-DEx)

As law enforcement agencies move toward the procurement of computer aided dispatch (CAD) and law enforcement records management systems (RMS), it is vital to recognize and consider the Law Enforcement Information Sharing Program (LEISP) developed by the U.S. Department of Justice (DOJ). The LEISP is designed to promote information sharing among all levels of the law enforcement community and to guide the investment of resources in information systems that will further this goal. The goals of LEISP are supported through the proliferation of the Global Justice Information Sharing Initiative (Global) Extensible Markup Language (XML) Data Model (Global JXDM). For additional information on the Global JXDM, visit www.it.ojp.gov. The Global JXDM is an XML standard

designed specifically for justice information exchanges. It provides law enforcement, public safety agencies, prosecutors, public defenders, and the judicial branch with a tool to effectively share data and information in a timely manner. There are several ongoing DOJ initiatives incorporated into the LEISP.

One program currently being developed jointly between the Federal Bureau of Investigation (FBI) and state and local law enforcement is the Law Enforcement National Data Exchange (N-DEx)[1] System. A second program—the Law Enforcement Regional Data Exchange (R-DEx)[2] System—has been developed and implemented by the FBI. Both programs are new law enforcement information sharing systems based upon the above critical standards.

## Document Scope

This document presents standard functional specifications for law enforcement CAD systems. The specifications found in this document are intended to be generic in nature rather than favor one particular system or approach over another; they are at the functional level, meaning that they define what is to be accomplished versus how it should be accomplished. These specifications were developed to depict the minimal amount of functionality that a new law enforcement CAD system should contain. They are not intended to simply be substituted for an RFP but should be tailored to fit the specific needs of each agency or group of agencies looking to purchase a new or upgrade an old CAD system. These specifications should be used as a starting point to build a fully functional (based on agency needs) CAD system that is based on open standards in order to efficiently interface and share information with other systems both internally and externally.

It is expected that the process of defining detailed information exchanges in a CAD system will be addressed in future phases of this project. In addition, these specifications are intended to be used in conjunction with technical standards, including the Global JXDM, in order to streamline the process of sharing information.

It is intended that these standards will be updated and augmented on a regular basis.

## Introduction

CAD systems allow public safety operations and communications to be augmented, assisted, or partially controlled by an automated system. It can include, among other capabilities, computer-controlled emergency vehicle dispatching, vehicle status, incident reporting, and management information.

All aspects of a CAD system must be optimized for rapid response time and system reliability. Since time is of the essence, the CAD system must accurately provide a data and time stamp for every activity.

CAD systems collect the initial information for an incident and then provide the information to one or more RMS systems.

The CAD system also supports other activities that assist in the effective use of public safety resources, including shift change roll call, "Be on the lookout" (BOLO) files, and the ability to schedule a call in the future.

This document addresses the following business functions:

- Law Enforcement Dispatch
- CAD System Administrators
- Support Services
- Call Management and Management Reporting
- Interfaces
- EMS Dispatch
- Fire Dispatch
- Intelligent Transportation
- Properties

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1  The N-DEx Program is an incident- and case-based information sharing system (e.g., RMS) for local, state, tribal, and federal law enforcement agencies that securely collects and processes crime data in support of the investigative and analytical process and will provide law enforcement agencies with strategic and tactical capabilities that do not currently exist on a national scale. An N-DEx concept of operations (ConOps) document is being finalized to aid in the design of the N-DEx system and to ensure that stakeholders understand and share the N-DEx vision.

2  The R-DEx Project seeks to securely share sensitive but unclassified crime information between federal agencies, while allowing for connection with several existing regionally based local and state information sharing systems to impede criminal and terrorist activities. R-DEx is now operational in several metropolitan areas.

# Business Function:
# Law Enforcement Dispatch

## 1.1 Description:

Law enforcement agencies use CAD to facilitate incident response and communication in the field. CAD systems, in many cases, are the first point of entry for information coming into the law enforcement system. Typical CAD system functions include resource management, call taking, location verification, dispatching, unit status management, and call disposition. Additionally, mapping functionality, interface with mobile data computers (MDC), and interfaces with other external local, state, and federal information systems may be included. Call takers, dispatchers, and their supervisors are primary users of CAD. Units in the field may interact via mobile data computers.

## 1.2 Use Case Diagram[3] (see page 2)

## 1.3 Use Case Specification:  Call Taking

Calls for service (CFS) initiate the CAD process. Callers are citizens or other agencies requesting services from the agency or giving notification of events or activities of concern. A CFS may come from many different points of origin, such as alarm systems, E911 systems, direct calls (7- or 10-digit numbers), walk-ins, CAD-to-CAD interfaces, or Web-based systems.

The service requested by callers will consist of both emergency and nonemergency priorities. Call taking

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3  URL Integration collaborated with LEITSC to assist in the development of the functional standards. URL Integration used an alternative method to requirements analysis with their RequirementsModeler software. RequirementsModeler is based on Unified Modeling Language (UML), which is the de facto standard for documenting functional requirements. UML was created by the Object Management Group (OMG) in 1997 as a standard for visual object-oriented modeling.  RequirementsModeler, consistent with UML principles, automatically generates diagrams and process flow (Use Case and Activity diagrams).  URL Integration's Use Case and Activity diagrams were reproduced for use in this report.

consists of receiving the call, obtaining sufficient and accurate information from the caller, determining whether this is a duplicate of a call in progress, and recording or updating the CFS in the CAD system. The call taker may also apply procedures and guidelines to verify, analyze, classify, and prioritize the call prior to routing the CFS to the dispatcher. A CFS may also be generated by a unit in the field. The unit can contact the dispatcher or the call taker, or he may actually create the call electronically using the optional mobile data terminal (MDT) interface.
A CFS may be forwarded to a telephone reporting unit and be received from the telephone reporting unit.  This may include the ability to create a CFS for future scheduled events.

| Associated Actor | Relationship | Description |
|---|---|---|
| Caller | calls | In jurisdictions with an E911 interface, the call taker still talks to the caller, but the data from the E911 interface reduces call entry time. |
| Unit | initiates | |
| Alarm | initiates | Business alarm or other optional interface provides data only. |
| External CAD | calls | An external CAD may communicate with a call center in another jurisdiction if those jurisdictions are under an agreement to work together and have a CAD-to-CAD interface. |
| Call Taker | receives | In smaller agencies, the call taker may be the dispatcher. |

# 1.2 Use Case Diagram
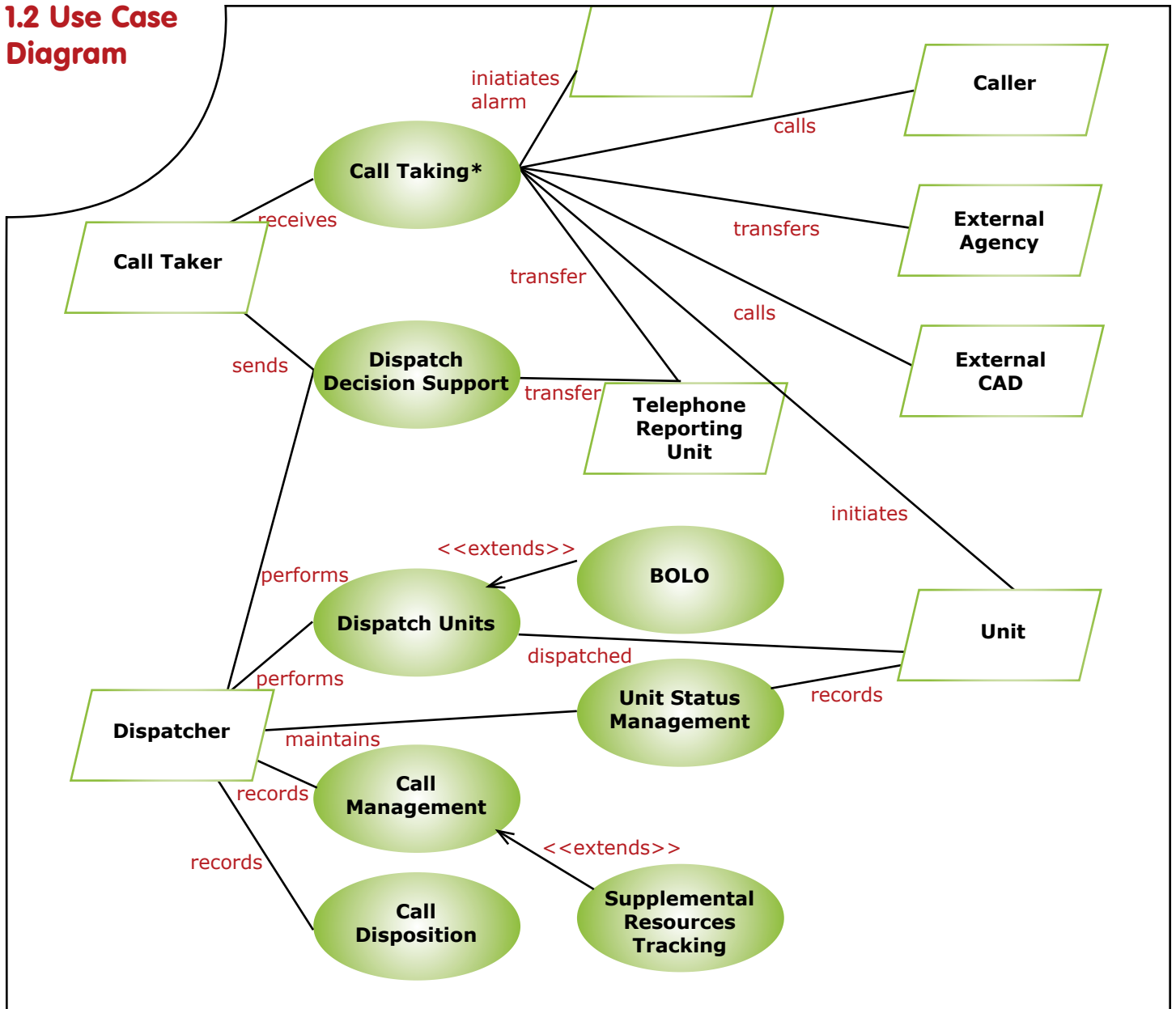


| Associated Actor | Relationship | Description |
|---|---|---|
| External Agency | transfers | This may be a call taker from another agency transferring the original call to the receiving agency. |
| Telephone Reporting Unit | transfer | |

## Flow of Events

### 1.3.1 Update CFS Data

[If duplicate] Information related to an open call will be updated as information becomes available. Multiple callers provide potential witnesses to the call and may provide additional or supportive information. This may result in reclassification and prioritization of the call. The dispatcher will need the ability to enter narrative data at any time prior to closing the CFS.

### 1.3.1.1 Notes

| Detail |
|---|
| Call may have already been dispatched. |

**Retrieve Incoming Call**

(person called) ◇ (alarm)

**Take Caller Data**

**Retrieve Alarm Location**

**Capture Location**

**Verify Location** → **Assign Call Classification and Priority**

**Check for Duplicate Calls**

(first call) ◇ (duplicate)

**Create Call for Service**

**Update CFS Data**

**Correlate to Sector** → **Retrieve Preraise Hazard and History**

(if person information is available) ◇ (if no person information is available)

**Retrieve Person Information**

**Retrieve Vehicle Information**

**Determine Dispatch Need**

(resource dispatch not warranted) ◇ **Utilize Call Disposition**

(appropriate to dispatch)

**Routed**

### 1.3.2 Determine Dispatch Need

A decision is made to dispatch a unit or direct the CFS for disposition.

#### 1.3.2.1 Notes

| Detail |
| --- |
| This flow assumes that the call taker is also the dispatcher, which is common practice in small and medium-size agencies.  In larger agencies, call takers route calls to dispatchers, who handle the incident management from that point forward. |

### 1.3.3 Utilize Call Disposition

[If resource dispatch not warranted] A call taker may close a CFS that does not require the dispatch of resources.

A CFS will be closed when the units at the scene have completed the assignment.  Depending on the agency standard operating procedures (SOP), the primary unit may close the call with a status.  The dispatcher is notified by assigned units of their status change using voice or mobile data computer (MDC) transactions.  MDC transactions may update CAD to record the unit status and close the CFS, if the data received indicates the CFS is complete.  The CFS will be classified with a specific disposition, generally provided by the primary unit.

When a call is closed, information collected during the CFS may be automatically transferred from the CAD system to the records management system (RMS).  Any updates made by the CAD operators on reopened calls will be automatically transferred to the RMS, subject to agency policies.

In instances where a duplicate call is identified, one call is disposed with a cross-reference to the original CFS.  The calls will be linked for future retrievability.

### 1.3.4 Assign Call Classification and Priority

Assign a nature code, which may include general classification and subtypes of the call, based upon agency policy.

The call will be prioritized based upon type, applying established guidelines and procedures, to determine the appropriate dispatch and response needs.

### 1.3.5 Check for Duplicate Calls

The system automatically evaluates the CFS location (and potentially other site parameters) to determine whether a call is a duplicate.  The call taker evaluates the information presented by the system with that obtained from the caller to make the final decision regarding duplicate calls.  Calls for service may be received by many sources for the same CFS, such as a traffic accident witnessed by two or more motorists or a fire alarm reported from an electronic monitoring system or a witness reporting smoke coming from a business.  The call may be determined to be unique, but there should be a capability of linking the call to another existing call.

This analysis will determine whether a new CFS is recorded in CAD or whether an existing CFS is to be updated with information not yet captured.

#### 1.3.5.1 Notes

| Detail |
| --- |
| [Description]  The call taker may have the ability to reopen a call but may not be able to close the call once it has been reopened. |

### 1.3.6 Take Caller Data

[If person caller] The call taker requests basic information of the caller.  Many 911 systems provide information about the phone account (ANI) originating the call, which may or may not be verified immediately, depending on the nature and priority of the call.

The basic information needed to open and initiate a CFS is the type of call (nature of the complaint), the priority, and the location of the CFS.  Depending upon the priority of the call, when basic information has been entered, the CFS can be routed to the appropriate dispatcher for handling.

### 1.3.7 Capture Location

In many instances, the call taker has access to the call origination location (ALI/ANI) data using the 911 system.  If not, the CFS location must be elicited from the caller.  In some incidents, the caller's location may not be the location of the call for service.

#### 1.3.7.1 Alternative Flows

| Detail |
| --- |
| If the call is generated from the 911 system, the location may be available from ANI/ALI, if such an interface exists.  Phase I cellular calls may give the location of the nearest tower.  Phase II cellular may give the coordinates of the caller. |
| Beyond latitude and longitude, the altitude may be captured. |

### 1.3.8 Verify Location

The caller location will be checked against current address listings in the system.  Locations that are not verified provide an indication to the call taker that information received may be inaccurate, providing additional information for the dispatcher to relay to the responder.

The location format can be a street address (blockface address), intersection, or common place name.  Location

information for a common place, such as the City Hall, has a street address listing cross-reference that will provide the legal street address.  Information will be contained in a geofile, which must include latitude and longitude.  Altitude would be optional.

The geofile will:

1. Validate that the street name is an actual street in the service area.
2. Resolve ambiguities while accounting for spelling variations and duplications.
3. Validate intersections.
4. Validate address range.
5. Relate common place names to actual addresses.
6. Relate X/Y/Z coordinates to an actual address.
7. Transform latitude and longitude to map coordinates for display.
8. Translate call location to agency reporting area.
9. Translate alias names to actual street names.

### 1.3.9 Retrieve Incoming Calls

Incoming calls by phone are answered in the order that they come in.  Calls from the 911 system are given a priority over calls from direct phone lines.  The center's operating procedures will determine whether any call is allowed to go to voice mail or be put on hold.

### 1.3.9.1 Alternative Flows

| Detail |
|---|
| The call taker answers calls from the public from a 911 line, a 7- or 10-digit phone number, or a TDD/TTY device for the hearing-impaired. |

### 1.3.10 Retrieve Person Information

[If person information is available] Person information may include history, protection orders, warrants, mental or health issues, gang information, sex offender registry information, etc.

This could be automatically queried based upon information entered into fields, if available.

### 1.3.11 Retrieve Vehicle Information

Any pertinent information of a vehicle. This could be automatically queried based upon information entered into fields, if available.

### 1.3.11.1 Alternative Flows

| Detail |
|---|
| This flow assumes that the call taker is also the dispatcher, which is common practice in small and medium-size agencies.  In larger agencies, call takers route calls to dispatchers, who handle the incident management from that point forward. |

### 1.3.12 Retrieve Premise Hazard and History

Relevant historical and tactical information about specific and neighboring premises is obtained from internal and/or external sources for decision support.  This information may include information about previous calls for service at the premise, whether the premise has records of registered firearms, hazardous materials stored at the site (usually business sites), serious medical information concerning individuals residing at the premise, and other relevant information.

### 1.3.13 Create Call for Service

[If first call] A new call for service is recorded in the CAD using information compiled to date.  A unique call number is assigned.

### 1.3.14 Correlate to Sector

The location information obtained from the caller and verified by the geofile will be checked to identify the patrol area assignment in which the call is located.

### 1.3.14.1 Alternative Flows

| Detail |
|---|
| In larger agencies, it is the call taker's function to simply determine the nature of the call and the call location and then route the call to the dispatcher so that units can be placed en route. |

### 1.3.15 Retrieve Alarm Location

[If alarm] Obtain the location of an electronic-generated call from the call source information.  Location and contact information from electronic sources may be received from data exchanges to CAD or may be obtained from a database of common addresses maintained by the agency.

| Postconditions | Postcondition Descriptions |
|---|---|
| Routed | Information in voice, paper, or electronic form was recorded and sent or distributed to intended recipients. |

**Dispatch Decision Support Activity Diagram**
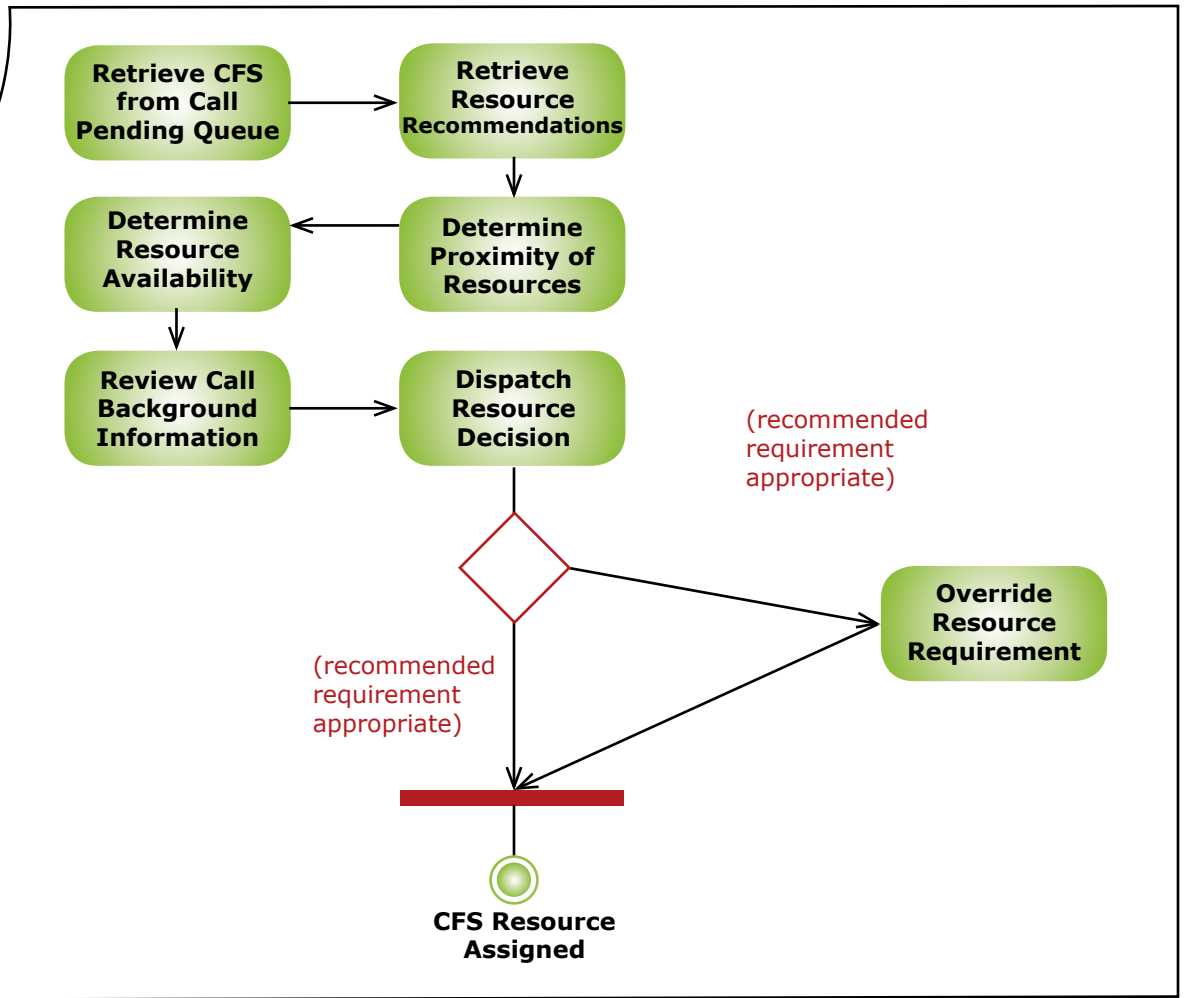


## 1.4 Use Case Specification: Dispatch Decision Support

The dispatcher is presented with the recommended resources for the selected CFS, based upon preset criteria for the type and priority of CFS. Further information will be considered, such as the history of the location, suspect, and the possibility that hazardous materials may be involved. The recommended resources may be overridden by the dispatcher based on the additional information or requests by officers on the scene. The system may have the capability to perform dispatch decision support, such as assigning an incident number without human intervention.

Units available will be considered as well as the available unit proximity to the CFS. The final decision is which specific units to dispatch.

| Associated Actor | Relationship | Description |
|---|---|---|
| Call Taker | calls | |
| Dispatcher | performs | |

| Associated Actor | Relationship | Description |
|---|---|---|
| Telephone Reporting Unit | transfer | |

## Flow of Events

### 1.4.1 Review Call Background Information

The information associated with the location and /or affiliated person is considered to determine whether the recommended resources are adequate. The decision to override the resource requirement should be made if it is determined that the recommendation is inadequate.

### 1.4.2 Dispatch Resource Decision

Recommended resources are assigned based on SOPs that factor workload and unit capability with regard to skills and equipment required for the CFS, unit availability, and the proximity of resources.

### 1.4.3 Retrieve CFS From Call Pending Queue

The next CFS on the call pending queue is retrieved. The call will contain all information collected during the

call up to the point it is retrieved. Additional information may continue to be added to the call by call takers and dispatchers while the CFS is open.

Calls in the queue are stacked by agency-defined priority, often based on SOP. The CAD system allows the agency to determine the sort order of the call pending queue.

### 1.4.3.1 Alternative Flows

| Detail |
|---|
| In the event of an officer-initiated call, the unit can initiate a call by reporting the event to the dispatcher, who creates a new call for dispatch and places the officer on-scene at an initiated call. |
| Based on SOP, the officer may directly initiate the call through a mobile device, if available. |

### 1.4.3.2 Notes

| Detail |
|---|
| Events are stacked by agency-defined priority, often based on SOP. |

### 1.4.4 Retrieve Resource Recommendations

Resource recommendations are initially determined based on the call type, priority and location information, and other characteristics of the specific CFS. The call type and priority level are used based on agency policy and procedure. The dispatcher must review resources recommended by the system. In selecting appropriate resources, the dispatcher may consider a number of factors, such as proximity to the call location, number of units available, special skills or equipment, and the number and type of other CFS to which officers are responding. These factors may or may not have been considered in the initial system recommendation.

### 1.4.5 Override Resource Requirement

[If recommended requirement appropriate] The initial recommendation based upon known criteria may be adjusted based upon additional information that becomes available, such as learning that the suspect is known to be armed and dangerous. Override must be recorded.

### 1.4.6 Determine Resource Availability

Available resources are displayed based upon unit status, which would include unassigned as well as assigned with a lower priority status of call to which a unit is assigned. The units may be currently unassigned or assigned to a CFS with a designated type and priority level. Unassigned units are available to be dispatched.

### 1.4.7 Determine Proximity of Resources

Resource proximity can be based on a closeness calculation, which can be distance or driving time. Any unit suggestion must respect dispatch control areas and departmental SOP. Proximity determination can be supported by an optional AVL interface.

## 1.5 Use Case Specification: BOLO

BOLO (Be on the Lookout) can be an optional part of a CAD application or a part of an RMS system. BOLOs in CAD are created and maintained in a data file in CAD. These may be entered by a dispatcher or may be created by anyone who has been given the required security clearance to create or maintain the file.

Both an RMS interface and the mobile data terminal interface should support the creation and transmission of a BOLO. A BOLO should be assigned an expiration date, either by the person who creates it or by the system, based on department policy and available system resources. A typical BOLO file would include the nature of the BOLO, priority, date, range of effectiveness, subject person and subject vehicle information, and contact information. There should be a mechanism to search the BOLO and to print it in a report and to purge the BOLOs out of the date range.

## 1.6 Use Case Specification: Dispatch Units

The units specifically recommended or selected for a CFS will be dispatched and their acknowledgment recorded. Other units not dispatched may be notified of an event in progress if the CFS warrants. When multiple units are dispatched, one unit will be designated as the primary responder responsible for the CFS until it is completed.

| Associated Actor | Relationship | Description |
|---|---|---|
| Unit | dispatched | |
| Dispatcher | performs | |

## Flow of Events

### 1.6.1 Record Unit Activity

The unit status will be updated to associate the dispatched unit or units with the CFS, including location and time.

### 1.6.2 Place Call on Unassigned Status

[If unit pulled off of call] The unit is reassigned to a new call and automatically unassigned from the previous call.

## Dispatch Units Activity Diagram



**Dispatch Units Activity Diagram**

- Assign Units
- (dispatch) → Recognize Acknowledgement
- (alert or notify) → Utilize BOLO → Alert/Notify Units
- Recognize Acknowledgement → Record Unit Activity
- (unit pulled off of call) → Place Call on Unassigned Status
- (no call affected)
- Record CFS Activity
- Resources Dispatched
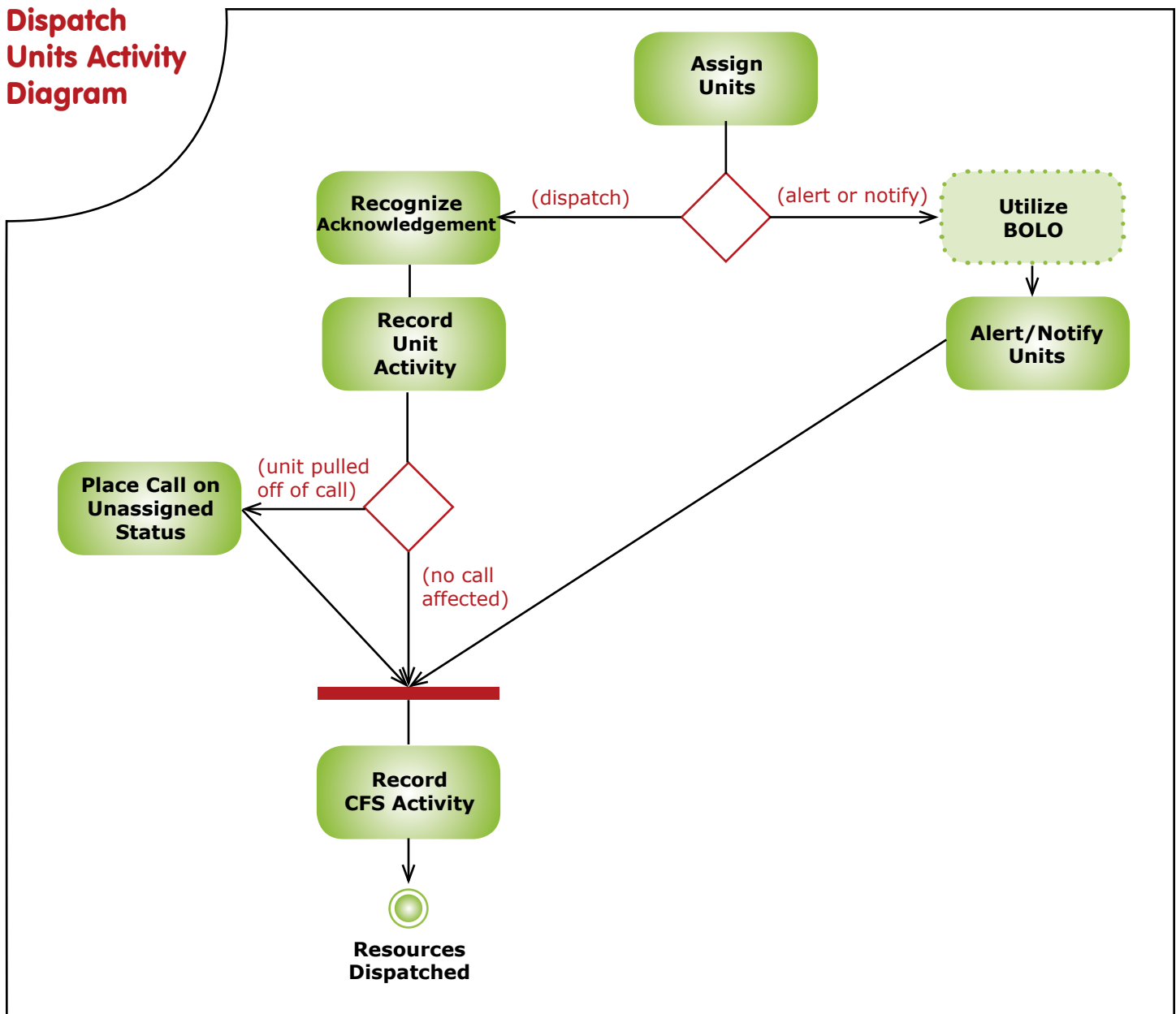
### 1.6.2.1 Notes

**Detail**

If all units are removed from the call, then the CFS is placed in the pending dispatch queue. This is often referred to as a preempted call.

### 1.6.3 Record CFS Activity

The CFS record will be updated to associate the unit or units dispatched as responding units to the call.

### 1.6.4 Recognize Acknowledgement

[If dispatch] The unit assigned to the call will respond to the dispatcher to confirm receipt of the dispatch information. This may be done by voice communication or through mobile data computers.

### 1.6.5 Alert/Notify Units

The dispatcher will relay information pertaining to calls for service to the appropriate units. This notification has the purpose of informing and raising the awareness of designated teams or all officers.

### 1.6.5.1 Alternative Flows

**Detail**

Alerting other units or command may not occur and is likely based on SOP.

### 1.6.6 Assign Units

The dispatcher will assign a CFS and relay pertinent information to the appropriate units in the field for the purpose of dispatching a responder. An optional MDC interface supports this activity.

Assigned but available units may be pulled off of current assigned status based on priority levels and the resource needs of the CFS. If all the units are pulled off of a call, the call will be added back into the dispatch queue.

### 1.6.6.1 Notes

| Detail |
|---|
| Decision point. Unit may be diverted en route while encountering incident. This would return to officer-initiated dispatch. |
| [Description]  Decision to alert or notify is based upon SOP. |

### 1.6.7 Utilize BOLO

[If alert or notify] BOLO (Be on the Lookout) can be an optional part of a CAD application or a part of an RMS

## Unit Status Management Activity Diagram

system. BOLOs in CAD are created and maintained in a data file in CAD. These may be entered by a dispatcher or may be created by anyone who has been given the required security clearance to create or maintain the file.

Both an RMS interface and the mobile data terminal interface should support the creation and transmission of a BOLO. A BOLO should be assigned an expiration date, either by the person who creates it or by the system, based on department policy and available system resources. A ty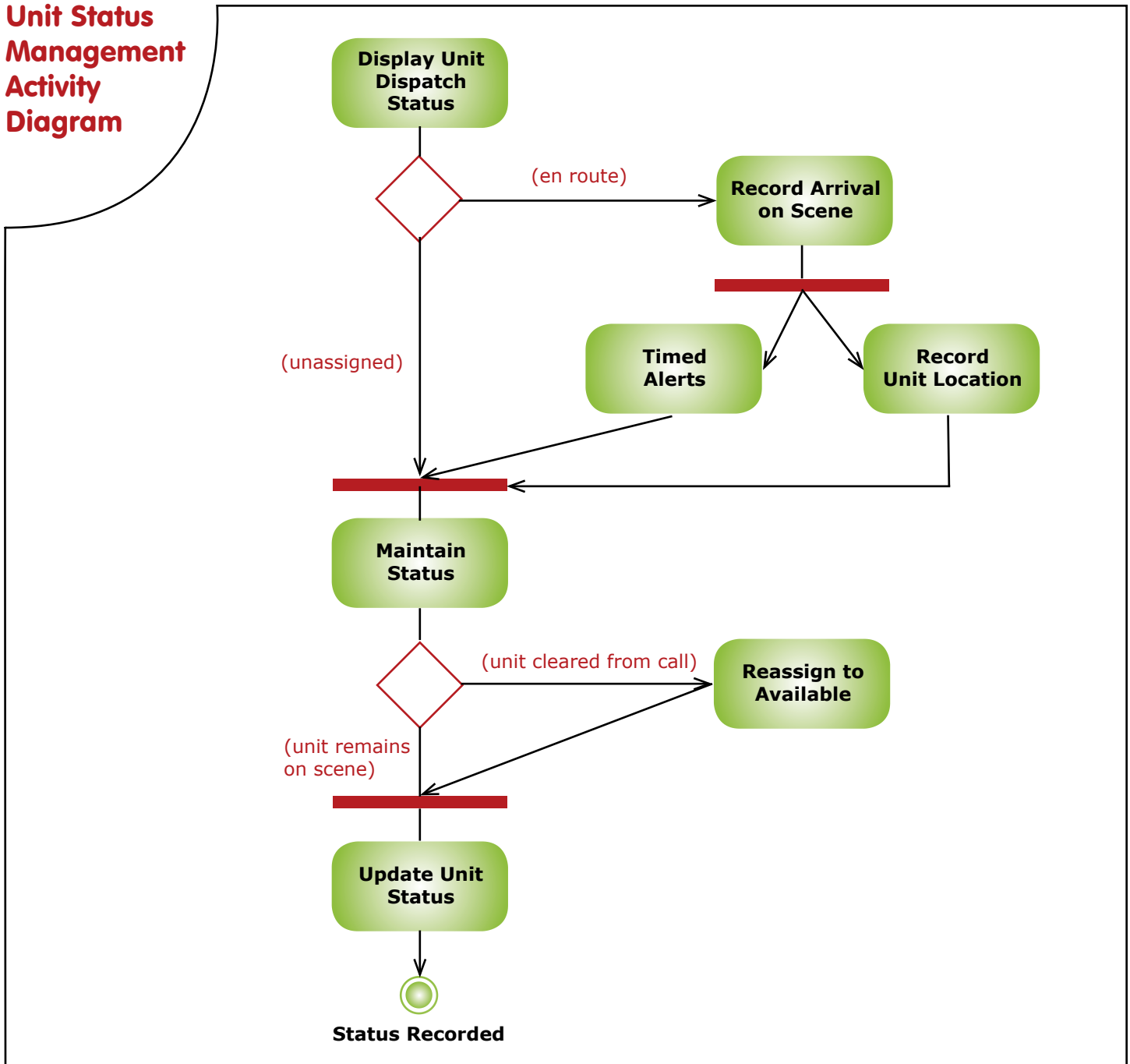pical BOLO file would include the nature of the BOLO, priority, date, range of effectiveness, subject person and subject vehicle information, and contact information. There should be a mechanism to search the BOLO and to print it in a report and to purge the BOLOs out of the date range.

# 1.7 Use Case Specification: Unit Status Management

Unit status must be continually monitored, updated, and recorded by the dispatcher. This information may be made available by voice communication or through mobile data computers. In addition to recording the unit status and destination, the CFS number and times (action) will also be recorded by the system. The recording of status changes is representative of a unit's work activity during a time interval. This information is essential to running standard CFS reports.

The system should maintain the elapsed time between status changes/checks and alert the dispatcher when agency-defined thresholds are met.

| Associated Actor | Relationship | Description |
|---|---|---|
| Unit | records | |
| Dispatcher | maintains | |

# Flow of Events

### 1.7.1 Display Unit Dispatch Status

The current status of units will be available at all times. The display will indicate the unit's status and assigned calls for service (if any). The display can also show the location or last known location of the unit. In the absence of AVL, the location may be the current call location, the last call location, or the location entered by the dispatcher or MDC. In the case of assigned units, the display may show any alert timer, the CFS type, and priority.

Examples include arrived on scene, available, unavailable, and unavailable but assignable. More status types should be configurable.

### 1.7.1.1 Notes

| Detail |
|---|
| [Description] Decision point. Unit may be diverted en route while encountering an incident. This would return to officer-initiated dispatch. |

### 1.7.2 Record Arrival on Scene

[If en route] Units responding to the scene communicate to dispatch that they have arrived at the location. This communication may occur verbally or through an MDC transmission that may automatically update CAD to reflect the current status of the responding unit, including time of arrival on scene.

There may be a need to record multiple arrival times; an example would be the arrival at the location and another arrival at the scene. For example, a unit may arrive at the location of a high-rise building and at a later time will arrive at the scene located within the building. The system should provide for the setting of different timers based upon time-of-arrival type.

### 1.7.2.1 Notes

| Detail |
|---|
| [Description] The system should maintain a date- and time-stamped unit log that includes all changes in unit status. |

### 1.7.3 Timed Alerts

The system must be able to alert the dispatcher to the expiration of the timer associated with any status change. The alert to the dispatcher may be in the form of a tone and/or a visual prompt. This should be configurable based upon the type of CFS. The system should record the acknowledgement or action of the dispatcher in response to the prompt, which will automatically reset the timer.

### 1.7.4 Record Unit Location

Any change in unit location is captured along with time stamps, including changes of location associated with the same CFS.

### 1.7.5 Maintain Status

[If unassigned] Information is continually displayed in CAD to reflect the current status of units that are monitored by the dispatcher.

### 1.7.6 Reassign to Available

[If unit cleared from call] When a unit has cleared from a scene and is no longer assigned to the CFS, the unit will be reassigned to an available status. Data received from MDC transmissions may update CAD and reflect the new status of the unit. The unit may remain on scene and have an available on-scene status.

# Call Management Activity Diagram

**Assign RMS Incident Number**

(RMS requires incident data) → **Transfer Basic Incident Data to RMS**

(no additional information)

**Display CFS Data**

(additional information available) → **Display Additional CFS Data**

(closed CFS identified) → **Reopen CFS**

(open call)

**Update CFS Data**

(resource requirement changed) → **Dispatch Resource Decision**

(additional resources needed) → **Assign Units**

(less resources needed)

(supplemental resources needed) → **Utilize Supplemental Resources Tracking**

(supplemental resources not needed)

(resource requirement not changed)

**Update Assigned Resources**

(additional information)

**Update Call Status**

**Call Monitored**

### 1.7.6.1 Notes

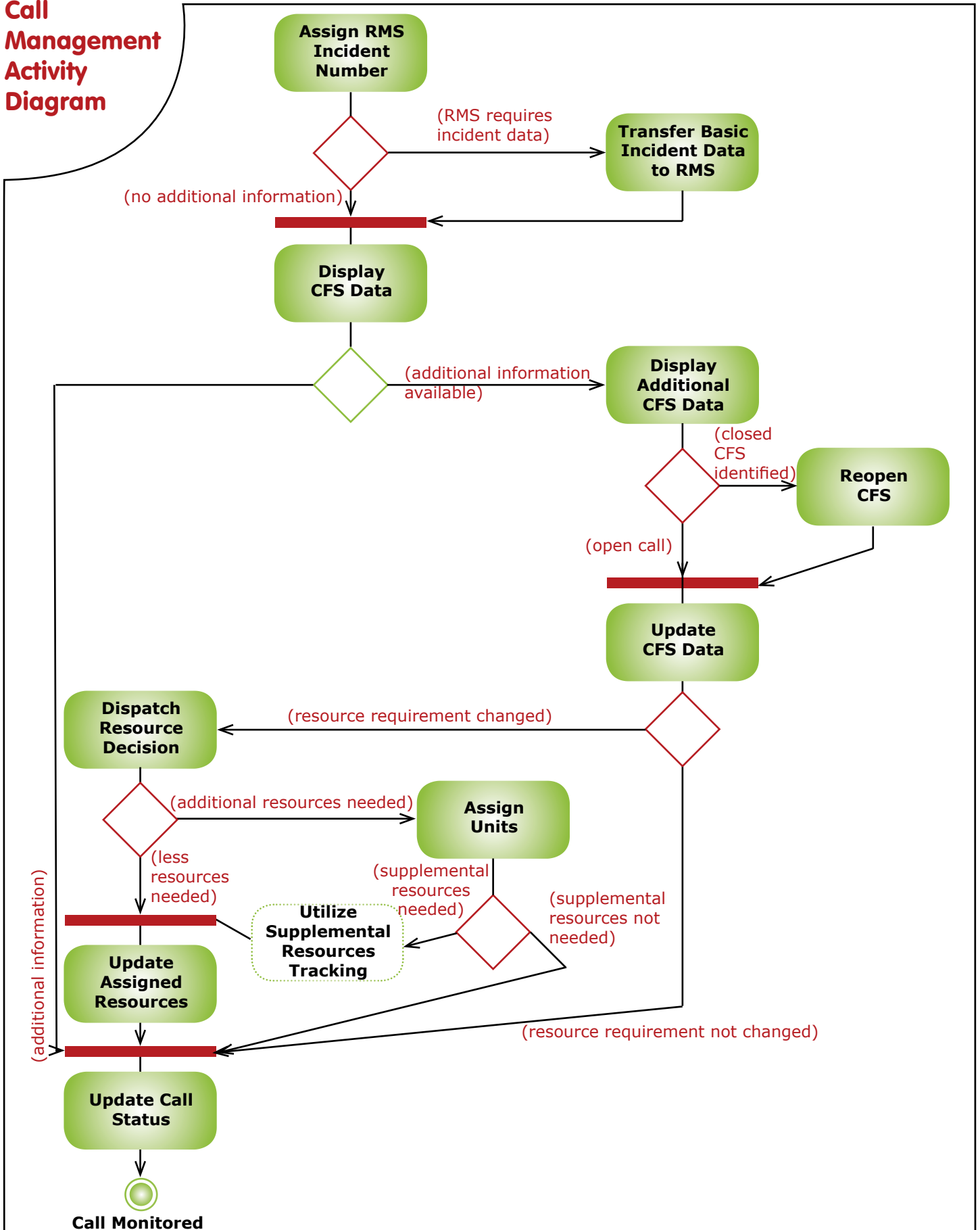| Detail |
| --- |
| Clearing the call may have the capability of clearing all units assigned to the CFS when all units simultaneously are reassigned to available status. |

### 1.7.7 Update Unit Status

[If unit remains on scene] Information is continually updated in CAD to reflect the current status of units that are monitored by the dispatcher.

## Postconditions

| Postcondition | Description |
| --- | --- |
| Status Recorded | The status of the unit is recorded in the CAD system. |

## 1.8 Use Case Specification:  Call Management

The call is managed by continually updating the CFS data with any additional information reported by callers or officers on scene.  The resource recommendations may be revised based on additional information and may be added or reassigned.

| Postcondition | Relationship | Description |
| --- | --- | --- |
| Dispatcher | records | |

## Flow of Events

### 1.8.1 Display CFS Data

[If no additional information] The CFS will need to be displayed and monitored through CAD.  This includes activities such as additional call information and activities reported by the officers.  Immediate access to all open calls (including unassigned) should be provided on the CFS status display. When a call is closed, it will automatically be removed from the call display.

### 1.8.2 Update Call Status

[If no additional information, resource requirement unchanged, supplemental resources not needed] The status of the call is updated as new information is received. This should include updating the reported CFS type to the actual CFS type.  For example, once the immediate incident is resolved, the responding unit will communicate to the dispatcher that the scene is secured.

### 1.8.2.1 Alternative Flows

| Detail |
| --- |
| In some jurisdictions, dispatchers may not always make the decision as to whether the event has adequate resources.  In those instances, it is most likely a commander on scene that makes this determination and the dispatcher will respond by sending more units when requested by those on scene. |

### 1.8.3 Dispatch Resource Decision

[If resource requirement changed] Recommended resources will be assigned based on SOP that factor workload and unit capability with regard to skills and equipment required for the CFS, unit availability, and the proximity of resources.

### 1.8.4 Update Assigned Resources

[If less resources needed] When required resources for the call have changed, this will be adjusted and recorded on predetermined criteria.

### 1.8.5 Utilize Supplemental Resources Tracking

[If supplemental resources needed] For example, in cases where a vehicle has been confiscated or found to be disabled, the dispatcher needs the ability to request the services of a towing company.  This request may be made by company name (owner requested) or by rotation.  In cases where the owner does not have a preferred company, the system will select a company from the towing rotation.  A towing rotation prevents any one company from being favored over another.

If resources other than those recommended by the rotation are selected, the system should capture the reason for the exception.

### 1.8.6 Assign Units

[If additional resources needed] The dispatcher will assign a CFS and relay pertinent information to the appropriate units in the field for the purpose of dispatching a responder.  An optional MDC interface supports this activity.

Assigned but available units may be pulled off of current assigned status based on priority levels and the resource needs of the CFS.  If all the units are pulled off of a call, the call will be added back into the dispatch queue.

### 1.8.7 Update CFS Data

[If open call] Information related to an open call will be updated as information becomes available.  Multiple callers provide potential witnesses to the call and may provide additional or supportive information.  This may result in reclassification and prioritization of the call.  The dispatcher will need the ability to enter narrative data at any time prior to closing the CFS.

### 1.8.8 Assign RMS Incident Number

In addition to the CAD CFS number, an RMS incident number (case number) may be assigned before the call is transferred to the RMS system. This may happen at any time prior to sending the report but most likely after the determination that it will be sent. The RMS number may be assigned from a data file of incident numbers maintained in the CAD system in coordination with the RMS system. Department policies in this area must be supported by the CAD system.

### 1.8.9 Transfer Basic Incident Data to RMS

[If RMS requires incident data] Basic incident data that can be modified will be transferred to the agency records section for its use. It will be transferred in an editable format.

This function relates to the transfer from CAD to RMS of the CFS data elements normally contained in a law enforcement incident report. In fact, the Justice XML reference document for a law enforcement incident report should provide an excellent standard for the transfer.

The following are examples of the types of data found in an incident report: report number, CAD call type, nature of call, date/time of call, location of incident, and persons and vehicles involved. The CAD CFS number should be included to provide a cross-reference between the CFS and the subsequent incident report.

Incident transfer is normally triggered and takes place automatically. Within the framework of this standard, it would happen (optionally) as an incident report number is assigned and at the time of final disposition of the CFS. The CAD systems should include a feature whereby administrative commands can be executed to transfer either a specific incident or a series of incidents based upon parameters.

### 1.8.10 Display Additional CFS Data

[If additional information available] As additional information is made available, the dispatcher will be alerted and have the ability to view the new information; for example, any information entered by a call taker or another dispatcher.

### 1.8.10.1 Notes

**Detail**

There needs to be a means to easily display recently closed calls.

### 1.8.11 Reopen CFS

[If closed CFS identified] An existing CFS is reopened for update. Changes are traced for audit purposes.

### 1.8.11.1 Notes

**Detail**

[Description] A CFS may be reopened by a dispatcher or call taker, but the call taker may not have the ability to close a reopened call.



**Supplemental Resources Tracking Activity Diagram**
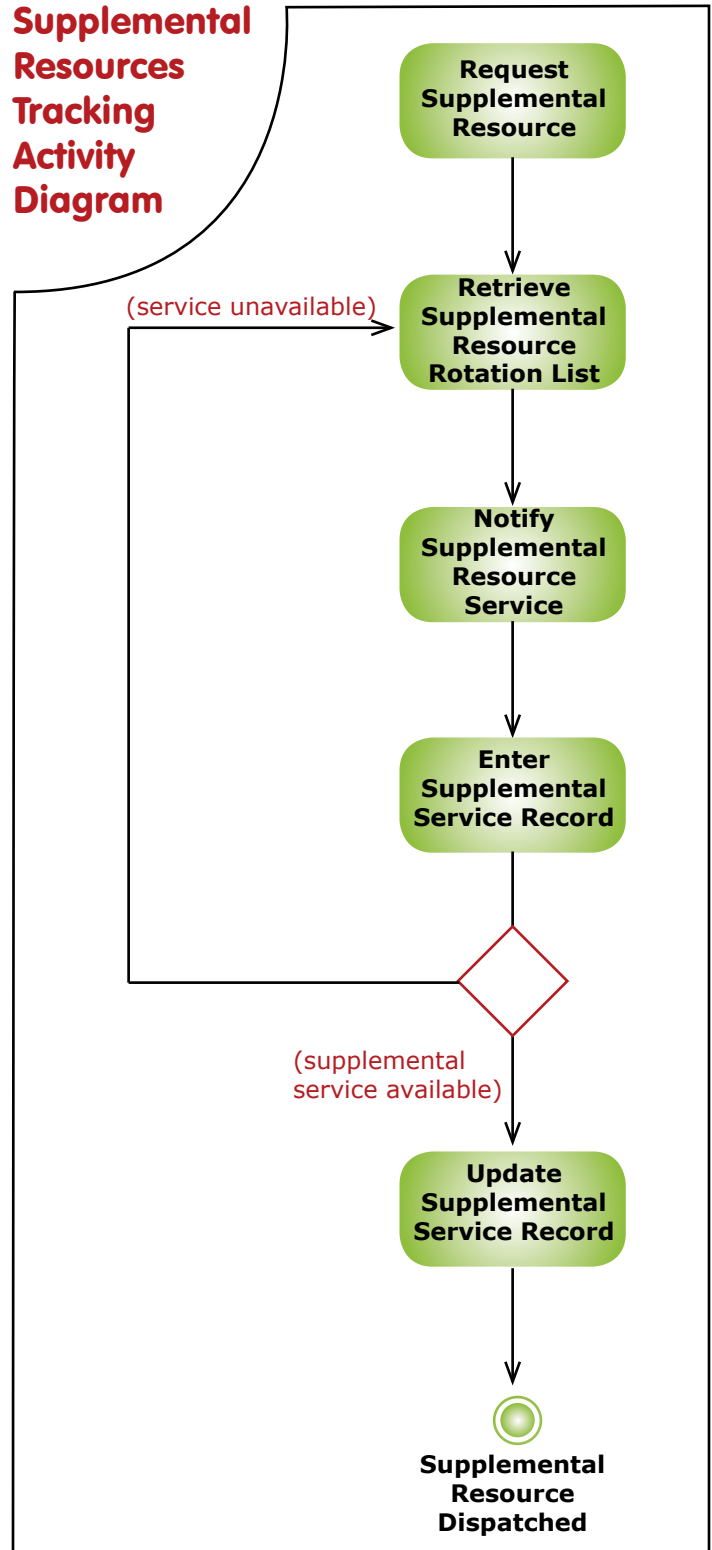
## 1.9 Use Case Specification: Supplemental Resources Tracking

For example, in cases where a vehicle has been confiscated or found to be disabled, the dispatcher needs the ability to request the services of a towing company. This request may be made by company name (owner-requested) or by rotation. In cases where the owner does not have a preferred company, the system will select a company from the towing rotation. A towing rotation prevents any one company from being favored over another.

If resources other than those recommended by the rotation are selected, the system should capture the reason for the exception.

## Flow of Events

### 1.9.1 Request Supplemental Resource

A law enforcement official requests that a supplemental resource service be dispatched to a specified location.

### 1.9.2 Retrieve Supplemental Resource Rotation List

[If supplemental service unavailable] The agency will obtain the contact information from the system in order to contact and request service from the next eligible service.

**Call Disposition Activity Diagram**
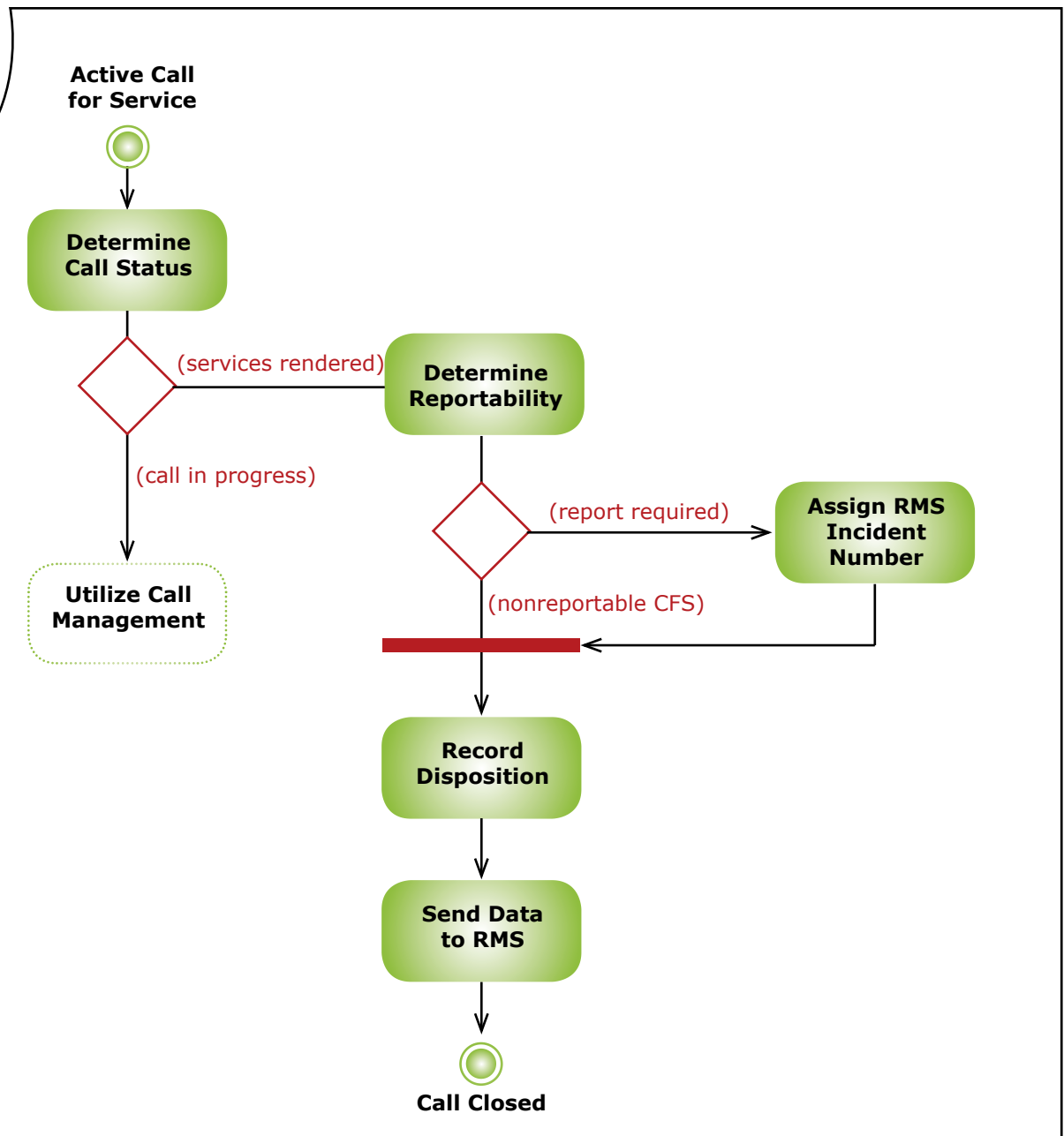
The system may provide a list of one or more services. This could be based on geographical requirements.

### 1.9.3 Notify Supplemental Resource Service

The supplemental resource will be contacted to provide dispatch information by the dispatcher and will be provided information about the incident to which it is requested to respond. The availability of the service to provide services will be recorded. A supplemental service that cannot be contacted or informs the agency of its inability to respond within a prescribed time is considered unavailable to provide the service. A supplemental resource will be selected from the list until one is found that is available.

### 1.9.4 Enter Supplemental Service Record

A record of supplemental service request is established to reflect the instance of the selection from the service rotation list. This triggers the rotation to the next resource in the rotation. The rotation occurs regardless of the resource ability to respond to the request.

### 1.9.5 Update Supplemental Service Record

[If supplemental service available] The supplemental resource response will be recorded in the system to reflect the services provided.

| Postcondition | Description |
|---|---|
| Supplemental Resource Dispatched | A supplemental resource was contacted with dispatch information and confirmed its availability to provide the service. |

## Postconditions

## 1.10 Use Case Specification: Call Disposition

A call taker may close a CFS that does not require the dispatch of resources.

A CFS will be closed when the units at the scene have completed the assignment. Depending on the agency SOP, the primary unit may close the call with a status. The dispatcher is notified by assigned units of their status change using voice or mobile data computer (MDC) transactions. MDC transactions may update CAD to record the unit status and close the CFS, if the data received indicates the CFS is complete. The CFS will be classified with a specific disposition, generally provided by the primary unit.

When a call is closed, information collected during the CFS may be automatically transferred from the CAD system to the records management system (RMS). Any

updates made by the CAD operators on reopened calls will be automatically transferred to the RMS, subject to agency policies.

Instances where a duplicate call is identified, one call is disposed with a cross-reference to the original CFS. The calls will be linked for future retrievability.

| Associated Actor | Relationship | Description |
|---|---|---|
| Dispatcher | records | |

## Flow of Events

### 1.10.1 Determine Call Status

The CFS will remain open and monitored. The status of the CFS may change as the situation is resolved. The optional MDT interface would allow the office to enter CFS disposition.

#### 1.10.1.1 Alternative Flows

| Detail |
|---|
| The optional MDT interface would allow the office to enter CFS disposition. |

### 1.10.2 Utilize Call Management

[If call in progress] The call is managed by continually updating the CFS data with any additional information reported by callers or officers on scene. The resource recommendations may be revised based on additional information and may be added or reassigned.

### 1.10.3 Determine Reportability

[If services rendered] CFS may vary in the need to report beyond the CAD system. Guidelines are defined by the agency policy based upon a combination of call type and call disposition.

#### 1.10.3.1 Alternative Flows

| Detail |
|---|
| If the CFS is reportable, the assignment of an incident number from the RMS system may occur when the incident number is sent back with CAD report data to the RMS. This may happen at any time prior to sending the report but most likely after the determination that it will be sent. |

### 1.10.4 Record Disposition

[If nonreportable CFS] Record the disposition of the call for service. This may include a narrative in addition to the type of disposition.

### 1.10.5 Send Data to RMS

Call history (complete details on closed calls) is typically maintained in a CAD system for a relatively short time

frame.  While in CAD, the CAD system provides access based on a series of retrieval keys and/or parameters, including but not limited to call number, location, date/time range, etc.  Call history applies to the complete call, including initial call information, unit assignments, status changes, imbedded inquiries and responses, triage requests and results, comments, cross-references, etc.  In other words, it contains everything that was recorded during the taking and handling of the CFS.

Long-term storage of call history records is normally relegated to either an RMS or a stand-alone calls-for-service system.  The CFS history system is used for data look-up and information retrieval, plus it supports extended statistical processes based on types of events, times to respond, calls by area, date/time, and so on.  Because of the need for statistical analysis, call history data needs to be structured so as to facilitate identifying specific types of data, such as events and associated dates and times.

### 1.10.6 Assign RMS Incident Number

[If report required] In addition to the CAD CFS number, an RMS incident number (case number) may be assigned before the call is transferred to the RMS system.  This may happen at any time prior to sending the report but most likely after the determination that it will be sent.  The RMS number may be assigned from a data file of incident numbers maintained in the CAD system in coordination with the RMS system.  Department policies in this area must be supported by the CAD system.

### 1.10.6.1 Notes

#### Detail

[Description]  An RMS incident number included in data sent to an RMS will trigger the creation of an instance of an incident report to relevant information captured from CAD.

# 2 Business Function: CAD System Administration

## 2.1 Description:

System administration encompasses a wide array of general requirements that law enforcement agencies need from CAD systems in order to be able to query information effectively; ensure appropriate access to information and systems security; and ensure effective information, image, and document management.

There are several distinct requirements associated with system administration:

1. Table maintenance
2. Security and data management
3. Geofile maintenance
4. Error logging
5. Customization

## 2.2 Use Case Diagram (see page 18)

## 2.3 Use Case Specification: Geofile Maintenance

The geofile is used to validate and standardize location and address information. It is also used to cross-reference addresses and locations with law enforcement-defined reporting areas, X/Y/Z coordinates, ZIP codes, and other identifiers. The geofile contains sufficient information to ensure that an address is valid. Furthermore, it provides cross-references to addresses and locations using common place names (e.g., business names, parks, hospitals, and schools) and street aliases. It includes information such as direction of travel on particular streets and can identify the side of a street for a specific address. It is assumed that all addresses in the RMS are validated using the system geofile.

The reporting area defined above should be used to define beats, sectors, command areas, neighborhoods, communities, etc.

The geofile contains the geographic information that is the basis for many decisions in a communications center. The system needs to provide the ability for an agency to enter and update all geofile data, including the physical address and the X/Y/Z coordinates.

The creation of a comprehensive geofile is a significant undertaking. The system should support the creation and maintenance of the geofile using an available mapping/GIS database. Geofile information in CAD and RMS should be synchronized, based on established parameters.

| Associated Actor | Relationship | Description |
|---|---|---|
| System | provides | |
| RMS | supplies | |

## 2.4 Use Case Specification: Security

Systems should allow tiered access to information based on passwords and other authentication and nonrepudiation practices. Role-based authentication and authorization must be a part of the RMS. Other identification technologies—such as biometrics, ID card, security token, etc.—are emerging standards.

Systems should apply appropriate edits to all entered data to ensure data integrity and maintain activity logs and audit trails.

## 2.2 CAD System Administration Use Case Diagram
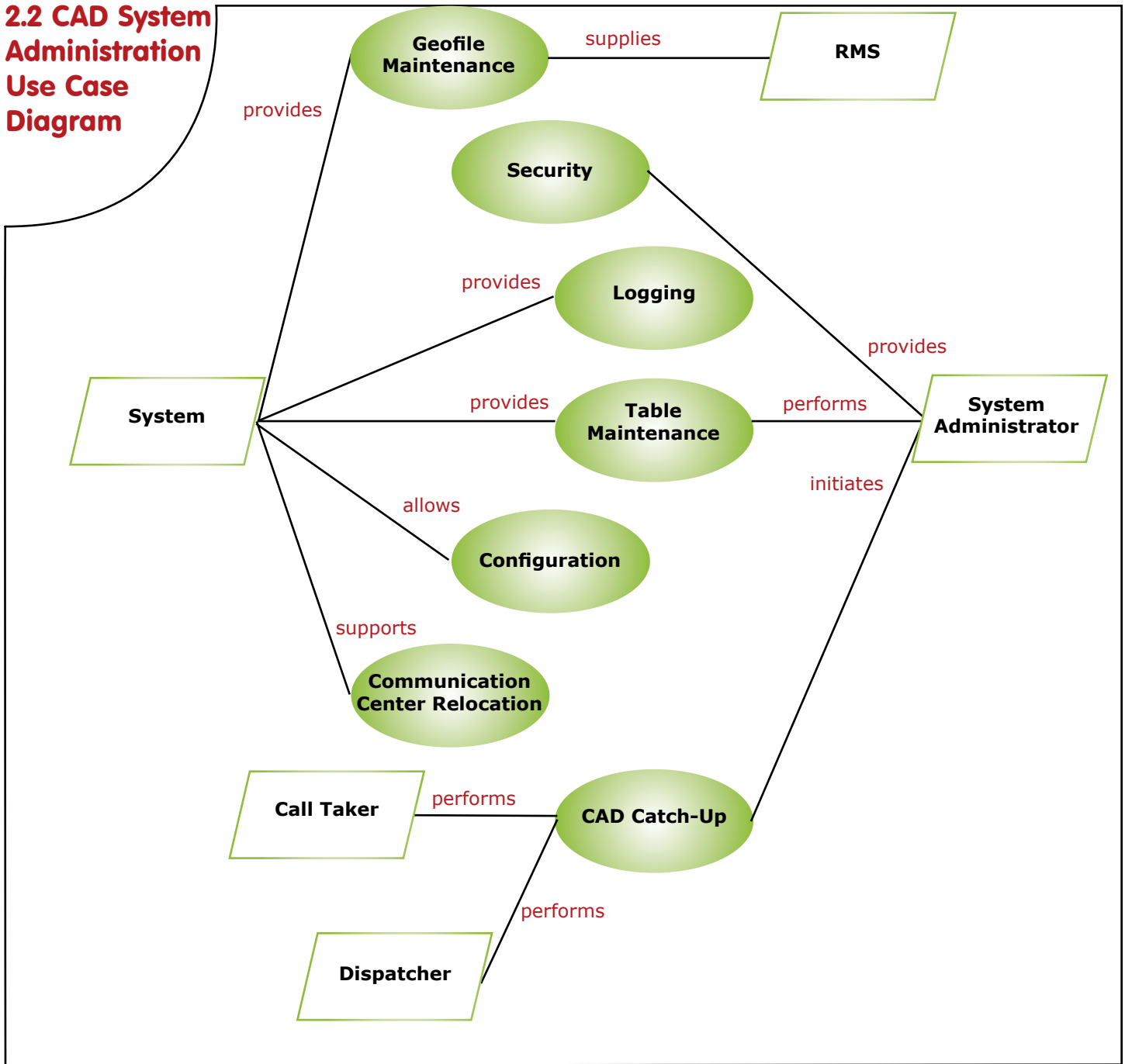


| Associated Actor | Relationship | Description |
| --- | --- | --- |
| System Administrator | provides | |

| Associated Actor | Relationship | Description |
| --- | --- | --- |
| System | provides | |

## 2.5 Use Case Specification:  Logging

CAD will log all actions, including security violations and attempted breaches, errors, changes, and updates. Logs should be viewable and searchable by the system administrator.

## 2.6 Use Case Specification: Configuration

The CAD should be configurable to allow for the enforcement of agency SOPs.  Examples would include resource allocation algorithms and dispatch policies.

The system should be configurable to determine screen parameters, color choices, font size, screen layout, and user preferences.

| Associated Actor | Relationship | Description |
|---|---|---|
| System | allows | |

## 2.7 Use Case Specification: Table Maintenance

The flexibility needed in a CAD system requires that the data used to support system recommendations or decisions be maintained in tables that can be supported and changed by the agency.  Each department will have their own set of Standard Operating Procedures (SOPs) that must be followed with regard to table maintenance.

In addition, the CAD system must be flexible enough to allow the system setup to reflect the SOPs at the time the system is initially installed and to be changed when the department SOPs change.   SOPs are typically defined and maintained in a separate document or they may be available for reference online as a CAD help file.

Examples of common tables include but are not limited to:

1. Units
2. Call types and priorities
3. Unit Status Types, e.g., assigned, unassigned, and assigned but available
4. Personnel, including emergency contact information and current assignment
5. Service Providers
6. Patrol and command area definitions
7. Timers
8. Commands

| Associated Actor | Relationship | Description |
|---|---|---|
| Systems | provides | |
| System Administrator | performs | |

## 2.8 Use Case Specification: Communication Center Relocation

The support of an emergency that requires that the dispatch center be moved to an off-site secure location must include a hardware system and network connectivity that will support the creation of an off-site, real-time backup server at the relocated communication center.

| Associated Actor | Relationship | Description |
|---|---|---|
| System | supports | |

## 2.9 Use Case Specification: CAD Catch-Up

The ability to recover from the interruption of CAD services, allowing the agency to enter activity data performed during the interruption of service.

| Associated Actor | Relationship | Description |
|---|---|---|
| System Administrator | initiates | |
| Call Taker | performs | |
| Dispatcher | performs | |

# Business Function:
# Support Services

**3**

## 3.1 Description:

In addition to the handling of calls for service, the CAD system should support the effective management of the available resources. The need for the optional items will be based on the agency size, the population served by the department, and other aspects of the specific department or departments served by the CAD system.

## 3.2 Use Case Diagram

Support Services Use Case Diagram

## 3.3 Use Case Specification: BOLO

BOLO (Be on the Lookout) can be an optional part of a CAD application or a part of an RMS system. BOLOs in CAD are created and maintained in a data file in CAD. These may be entered by a dispatcher or may be created by anyone who has been given the required security clearance to create or maintain the file.

Both an RMS interface and the mobile data terminal interface should support the creation and transmission of a BOLO. A BOLO should be assigned an expiration date, either by the person who creates it or by the system, based on department policy and available system resources. A typical BOLO file would include the nature of the BOLO, priority, date, range of effectiveness, subject person and subject vehicle information, and contact information. There should be a mechanism to search the BOLO and to print it in a report and to purge the BOLOs out of the date range.

## 3.2 Support Services Use Case Diagram

System    provides    BOLO

provides    Emergency Operations Center

| Associated Actor | Relationship | Description |
|---|---|---|
| System | provides | |

## 3.4 Use Case Specification: Emergency Operations Center

The support of an emergency that requires that the dispatch center be moved to an off-site, secure location must include a hardware system and network connectivity that will support the creation of an off-site, real-time backup at servers located at the Emergency Operations Center (EOC). Other functionality that can be provided by the CAD system in support of EOC operation includes remote CAD dispatching capability and support for multiagency event coordination.

These two optional features provide benefits to the CAD system even if the dispatcher does not have to be moved. Multiagency event coordination usually requires that support agreements be negotiated and in place among all of the agencies. Another desirable feature in support of an EOC would be the ability to add additional agencies "on the fly" during an emergency operation.

| Associated Actor | Relationship | Description |
|---|---|---|
| System | provides | |

# 4 Business Function: Call Management and Management Reporting

## 4.1 Description:

Command must be able to generate reports and manage the workflow of the call takers and dispatchers in the Dispatch Center.

## 4.2 Use Case Diagram

Call Management and Management Reporting Use Case Diagram

## 4.3 Use Case Specification:  Dispatch Supervisor Support

The CAD system should provide the supervisor with the ability to monitor the activity on any dispatcher workstation. If necessary, a supervisor needs to have the ability to take direct control over a dispatch position remotely, without leaving the supervisor console.
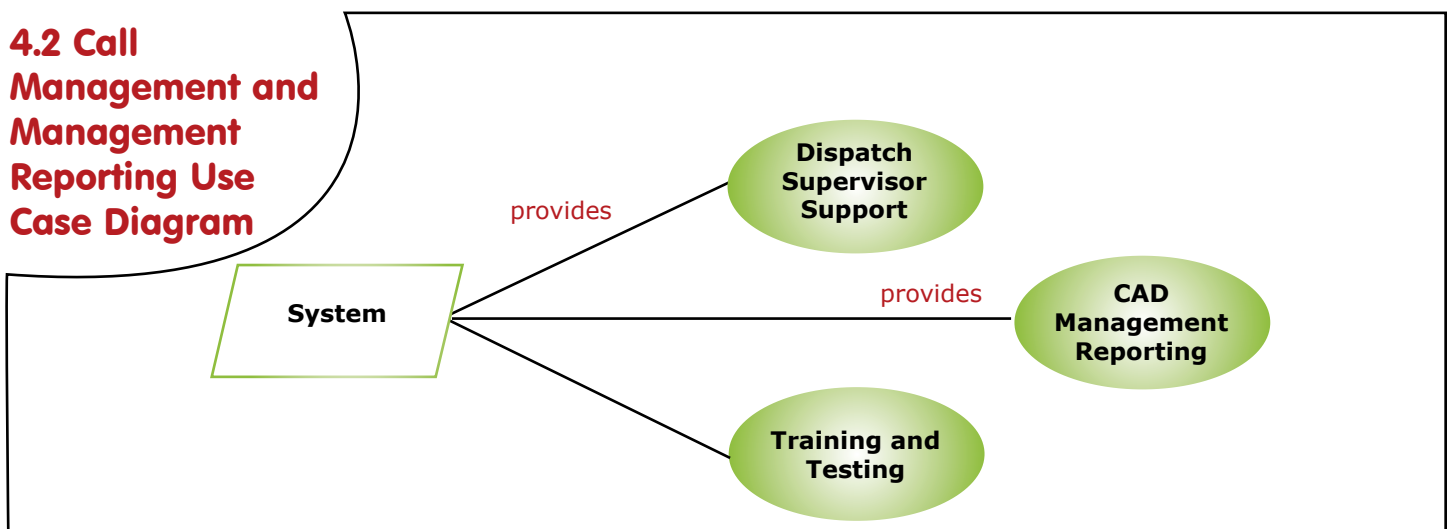
| Associated Actor | Relationship | Description |
|---|---|---|
| System | provides | |

## 4.4 Use Case Specification:  CAD Management Reporting

It is essential that the CAD system include standard reports that can be run using flexible parameters.  New reports should be defined either through the CAD system or a third-party reporting tool and then be stored as a standard report available through the CAD system.

The functionality needs to include the ability to report any data element by any other data element in the system.  This may include the ability to export data for use in third-party tools.  A wizard may be provided that allows for user-generated reports.

### 4.2 Call Management and Management Reporting Use Case Diagram

Examples of typical CAD reports include the following reports that can be run by any user-defined date and time range:

1. Daily log showing all calls received for the prior 24 hours from time of printing
2. Activity Analysis by specified geographical area and by time period
3. CFS Summary by specified geographical area and by time period
4. Activity Analysis by day of the week
5. Activity Analysis by hour of the day
6. Activity Analysis by day and hour
7. Response Time Analysis by specified geographical area and by time period
8. Response Time Analysis by call type
9. Time Consumed by call type by hour of the day
10. Workload Activity by resource
11. Workload Activity by group
12. Time Consumed by day of the week and hour of the day
13. Time Consumed by specified geographical area and by time period
14. Attempted breaches in security
15. Error messages by type for identifying system problems

Customizing reports to meet department needs should also be an option.

| Associated Actor | Relationship | Description |
|---|---|---|
| System | provides | |

## 4.5 Use Case Specification: Training and Testing

This function relates to the necessity of having a region on the CAD system that is isolated from the production environment for the purposes of program testing and file maintenance testing, as well as training of new personnel. This function may be referred to as a CAD training mode.

To the greatest extent possible, the training environment should be identical to the production region, thus allowing accurate testing and training to occur without impacting the production environment. The following are examples of the types of items to include in the training environment:

1. Definition of the types of agencies being utilized; i.e., Law, Fire, EMS
2. Tables defined to include unit names, recommendation patterns, premise information, personnel information, security permissions, etc.
3. Separate test E911 connection or a canned script of E911 information
4. Separate test mobile connection or a canned script of mobile information
5. Access to audible radio transmissions

The training environment should have its own start-and-stop sequence that is independent of the production environment. The training environment does not have to be active at all times and can be started as needed.

By having the training environment established and defined, the agency can develop a robust training program that simulates the live environment to include the associated interfaces and radio traffic. The personnel can enter incidents and "mock" live incidents that are occurring on the radio without the production environment data being affected.

Additionally, any programmatic change or changes to file maintenance records can be thoroughly tested and any issues resolved prior to being implemented in the production environment.

| Associated Actor | Relationship | Description |
|---|---|---|
| System | | |

# 5 Business Function:
# Interfaces

## 5.1 Description:

CAD systems will interface with one or more systems, some of which are considered more essential than others. Factors such as agency size, number of sworn officers, agency budget, and unique community factors will affect whether agencies wish to adopt these optional interfaces.

## 5.2 Use Case Diagram

## 5.3 Use Case Specification:  Primary

These CAD interfaces are considered to be essential for conducting primary law enforcement business functions. The four primary CAD interfaces are with the messaging system, the local RMS, Regional/State/NCIC Warehouses, and E911.

E911.  This interface imports subscriber information (ANI and ALI) for each E911 caller, as provided by the telephone company, into CAD-compliant entry process, eliminating the need for redundant data entry.  As an option, the E911 data can be simultaneously imported into the mapping system for immediate centering and display.

Regional/State/NCIC.  Query to state, local, and national databases. Queries to the state, local RMS, and national databases will occur automatically from selected CAD commands using the messaging system interface.  In addition, the operator (e.g., dispatcher or officer) will have the ability to use stand-alone query screens, eliminating redundant data entry.  Responses to such queries should be stored with the call record.

RMS:  See RMS Interfaces.

| Associated Actor | Relationship | Description |
|---|---|---|
| E911 | | |
| Messaging System | | |
| RMS | | |

## 5.4 Use Case Specification:  Additional Interfaces

It is often desirable to have a direct interface between the CAD system and other key law enforcement systems, such as other CAD systems in the area, RMS systems, alarm systems, and mobile data terminals.

CAD to CAD.  The CAD will act as a peer in a multi-CAD environment.  The CAD system will accept a new call for service from a participating CAD system, in an agreed-upon structure.  The CAD system can generate and transfer a request for service to a peer CAD agency. The CAD system logs all communication between peer agencies.

Mobile Data Terminal (MDT).  Mobile terminals in law enforcement vehicles provide an extension to the CAD dispatch services.  The CAD system must interface with one or more mobile communications infrastructures to which the mobile units are attached.  The CAD system can provide silent dispatch orders to a mobile unit, in addition to providing the unit with details of the call and premise history information.  The mobile unit can change its status, query CAD information, and query local and national databases, such as wanted-person checks.  The queries may not go through CAD but may be part of a separate mobile system.

Interfaces Use Case Diagram

- Primary
  - E911
  - RMS
  - Messaging System

- Additional Interfaces
  - Prearrival System
  - External CAD
  - Mobile Data
  - Alarms
  - Push-to-Talk

- Communications Interfaces
  - Internet Call Generation
  - E-Mailing
  - Faxing
  - Paging

- Locational Systems Interfaces
  - Mobile Mapping
  - GIS
  - AVL
  - Real-Time Mapping
  - null

- Administration Interfaces
  - Clock Synchronization
  - Resource Scheduling System

- Public Awareness Messaging
  - Reverse 911
  - Media

- Emergency Operations Interface
  - Emergency Operations Center

**Prearrival Instruction System.** The call taker answers to the questions posed by a prearrival system are written to CAD record of the call. Based on the capabilities of the prearrival system, the call taker may be prompted by the prearrival system based on the CAD call type.

**Alarm.** The CAD system can automatically recognize and accept notification of a business alarm. The system coordinates the alarm input with a key-holder to present information to a call taker. Based upon business rules, the call taker can accept the alarm call and generate a call for service or manually handle the call.

**RMS.** Whenever a case (report) number is generated for a CAD call for service, a basic set of CAD information is extracted and transferred to the RMS system to create the RMS incident shell. In addition, the CAD system may inquire into the RMS data files (e.g., master name index, master location index, warrants, or protective orders) for information that relates to the call.

A discussion of the business functions and situations that warrant CAD - RMS interface is explored in the LEITSC RMS functional specification.

| Associated Actor | Relationship | Description |
|---|---|---|
| Mobile Data | | |
| Prearrival System | | |
| Alarms | | |
| External CAD | | |
| Push-to-Talk | | |

## 5.5 Use Case Specification: Locational Systems Interfaces

Locational systems provide automated access to address, geographic, and mapping information for law enforcement. The primary locational systems include AVL, GIS, and Mobile and Real-Time Mapping:

**AVL.** The CAD system will accept input from an Automatic Vehicle Location system. CAD converts the vehicle geographical location (e.g., X/Y/Z coordinates) to a street address, records the vehicle's location in the unit history, and automatically performs a change location for the vehicle, if necessary.

**GIS.** Interface with the jurisdiction GIS to support maintenance of the CAD map; the law enforcement map layers, such as reporting districts/areas; and the creation of the CAD geofile.

**Mobile Mapping.** Dispatch information sent to the mobile can be mapped on the mobile itself. The map may provide the unit with driving instructions to the location.

**Real-Time Mapping.** Using the jurisdictional GIS information and the law enforcement map layers, the dispatcher has a tactical view of the city and/or dispatch area. The map can be controlled by specific CAD commands, such as zoom-and-pan, or preset commands, such as zooming to the address of a selected call for service. The dispatcher can map/view all units and open calls for service for an area or the city. Units and calls are labeled on the map.

| Associated Actor | Relationship | Description |
|---|---|---|
| Mobile Mapping | | |
| AVL | null | |
| AVL | | |
| Real-Time Mapping | | |
| GIS | | |

## 5.6 Use Case Specification: Administration Interfaces

The Administration CAD interfaces assist the law enforcement team of units, dispatchers, call takers, and command in working together. The key interfaces include Push-to-Talk, master time interface, and Resource Scheduling System:

**Push-to-Talk.** Import and display in a marquee fashion the radio ID (and optionally the Officer ID) information to the dispatcher by those keying mobile radios.

Interface and synchronize all servers and CAD workstations with the Master Time Clock. This ensures that each workstation and server provides an accurate time stamp.

**Resource Scheduling System.** A scheduling system provides the ability for the agency to schedule personnel, including communication center personnel and officers. This system is often found in the agency RMS.

Typically, the system has the ability to factor in many of the departmental rules for scheduling personnel for regular assignments and for overtime. The interface with the CAD system may include the ability to have one point of maintenance for the names and assignments of all personnel. An interface may also include the roll-call list for each shift change for dispatcher review and confirmation as units log on to the shift.

| Associated Actor | Relationship | Description |
|---|---|---|
| Clock Synchronization | | |
| Resource Scheduling System | | |

| Associated Actor | Relationship | Description |
|---|---|---|
| Paging | | |
| Faxing | | |
| E-Mailing | | |
| Internet Call Generation | | |
| Messaging System | | |

## 5.7 Use Case Specification: Communications Interfaces

There are several communications-based interfaces that allow CAD-generated information to be transmitted to others via e-mail, messaging, and the Internet.

Internet Call Generation.  The CAD system will accept nondispatchable calls across the Internet.  Calls accepted across the Internet will be of a general nature, in which a case (report) number may be needed for insurance purposes.  The case number is generated and recorded.  The call is recorded in the calls for service for statistical reporting.

Messaging System.  The messaging system is often provided through a messages switch that can be interfaced to the CAD system.  The messaging system supports unit-to-unit messaging and unit-to-dispatcher messaging via the MDT system.  Optionally, the messaging system may also support external messaging to other agencies.

Paging.  The CAD system will automatically perform an alphanumeric page for selected CAD calls and dispatches.  A dispatcher may initiate an alphanumeric page for any paging group.  The information sent in the page is configurable by the agency but generally contains the call number, type of call, and location of the call.  There is an administrative mechanism to define paging groups.

Faxing.  The CAD system will automatically format and send a FAX for selected CAD calls and dispatches.  A dispatcher may initiate a FAX for any call/CFS.  The information sent in a FAX is configurable by the agency but generally contains the call information or a list of open calls meeting certain search criteria.  There is an administrative mechanism to define FAX groups.

E-mailing.  The CAD system will automatically format and send an e-mail for selected CAD calls and dispatches.  A dispatcher may initiate an e-mail for any call/CFS.  The information sent in an e-mail is configurable by the agency but generally contains the call information or a list of open calls meeting certain search criteria.  There is an administrative mechanism to define e-mail groups.

## 5.8 Use Case Specification:  Public Awareness Messaging

Public awareness messaging is the ability to broadcast, publish, and send messages to individuals or agencies that need to be aware of critical events.  Examples include Amber Alert, critical incident occurrences, utilities, transportation, hospitals, or the public at large via the Internet.

Reverse 911.  This capability is typically a part of the telephone system used in the communication center.  The system maintains a list of all callers who have elected to be a part of this community alert system.   An information message can be created.  The system then calls every person on the list and plays the voice message.  There is usually not actually an interface between the CAD system and the Reverse 911 system unless the call list is maintained in the CAD database.  The Web interface is an option to provide citizens with the ability to add their name to the call list for noncritical incidents.

| Associated Actor | Relationship | Description |
|---|---|---|
| Reverse 911 | | |
| Media | | |

## 5.9 Use Case Specification:  Emergency Operations Interface

The operation of an emergency center requires the multidirectional exchange of information between CAD and EOC.  Units may be assigned to the EOC, at which point the EOC will take control of the unit until released.  CAD will maintain the ability to monitor the unit availability status.  CAD will continually update EOC with call information.

| Associated Actor | Relationship | Description |
|---|---|---|
| Emergency Operations Center | | |

## 5.10 Additional Business Functions

The CAD system should have the capability to communicate with one or more subsystems (i.e., EMS Dispatch, Fire Dispatch, and/or Intelligent Transportation). It is common for external agencies to become involved in a law enforcement call for service.  Reasons such as agency size, number of sworn officers, agency budget, and unique community factors will affect whether agencies wish to communicate with external subsystems.

# 6 Conclusion

LEITSC had a mission to create a national standard for law enforcement CAD systems and has succeeded in carrying out this task.

The CAD functional standards are meant to describe the minimal amount of functionality that a CAD system for law enforcement should contain. These standards should be used as a starting point to build a fully functional CAD system, based on agency needs and open standards, to efficiently interface and share information with other systems both internally and externally. They are designed to serve as a guiding tool for law enforcement agencies and should be tailored to fit the specific needs of each law enforcement agency or group of agencies looking to upgrade or purchase a new CAD system. Although the CAD functional standards were not developed to substitute for an RFP, they can be used to supplement an RFP.

The functional standards found in this document are intended to be generic in nature and do not favor one particular system or approach over another; they are at the functional level, meaning that they define what is to be accomplished versus how it should be accomplished.

The CAD functional standards were developed by the LEITSC Functional Standards Committee and are now available to all law enforcement agencies.

# Properties: Activity

## Alert/Notify Units
The dispatcher will relay information pertaining to calls for service to the appropriate units. This notification has the purpose of informing and raising the awareness of designated teams or all officers.

## Assign Call Classification and Priority
Assign nature code that may include general classification and subtypes of the call based upon agency policy.

The call will be prioritized based upon type, applying established guidelines and procedures, to determine the appropriate dispatch and response needs.

## Assign RMS Incident Number
In addition to the CAD CFS number, an RMS incident number (case number) may be assigned before the call is transferred to the RMS system. This may happen at any time prior to sending the report but most likely after the determination that it will be sent. The RMS number may be assigned from a data file of incident numbers maintained in the CAD system in coordination with the RMS system. Department policies in this area must be supported by the CAD system.

## Assign Units
The dispatcher will assign a CFS and relay pertinent information to the appropriate units in the field for the purpose of dispatching a responder. An optional MDC interface supports this activity.

Assigned but available units may be pulled off of current assigned status based on priority levels and the resource needs of the CFS. If all the units are pulled off of a call, the call will be added back into the dispatch queue.

## Capture Location
In many instances, the call taker has access to the call origination location (ALI/ANI) data using the 911 system.

If not, the CFS location must be elicited from the caller. In some incidents, the caller's location may not be the location of the call for service.

## Check for Duplicate Calls
The system automatically evaluates the CFS location (and potentially other site parameters) to determine whether a call is a duplicate. The call taker evaluates the information presented by the system with that obtained from the caller to make the final decision regarding duplicate calls. Calls for service may be received by many sources for the same CFS, such as a traffic accident witnessed by two or more motorists or a fire alarm reported from an electronic monitoring system and a witness reporting smoke coming from a business. The call may be determined to be unique, but there should be a capability of linking the call to another existing call.

This analysis will determine whether a new CFS is recorded in CAD or an existing CFS is to be updated with information not yet captured.

## Correlate to Sector
The location information obtained from the caller and verified by the geofile will be checked to identify the patrol area assignment in which the call is located.

## Create Call for Service
A new call for service is recorded in CAD using information compiled to date. A unique call number is assigned.

## Determine Call Status
The CFS will remain open and monitored. The status of the CFS may change as the situation is resolved. The optional MDT interface would allow the office to enter CFS disposition.

### Determine Dispatch Need

A decision is made to dispatch a unit or direct the CFS for disposition.

### Determine Proximity of Resources

Resource proximity can be based on a closeness calculation, which can be distance or driving time. Any unit suggestion must respect dispatch control areas and departmental SOP. Proximity determination can be supported by an optional AVL interface.

### Determine Reportability

CFS may vary in the need to report beyond the CAD system. Guidelines are defined by the agency policy based upon a combination of call type and call disposition.

### Determine Resource Availability

Available resources are displayed based upon unit status, which includes unassigned as well as assigned with a lower priority status of call to which a unit is assigned. The units may be currently unassigned or assigned to a CFS with a designated type and priority level. Unassigned units are available to be dispatched.

### Dispatch Resource Decision

Recommended resources to be assigned based on SOP, which factor workload, unit capability with regard to skills and equipment required for the CFS, unit availability, and the proximity of resources.

### Display Additional CFS Data

As additional information is made available, the dispatcher will be alerted and have the ability to view the new information; for example, any information entered by a call taker or another dispatcher.

### Display CFS Data

The CFS will need to be displayed and monitored through CAD. This includes activities such as additional call information and activities reported by the officers. Immediate access to all open calls (including unassigned) should be provided on the CFS status display. When a call is closed, it will automatically be removed from the call display.

### Display Unit Dispatch Status

The current status of units will be available at all times. The display will indicate the unit's status and assigned calls for service (if any). The display can also show the location or last known location of the unit. In the absence of AVL, the location may be the current call location, the last call location, or the location entered by the dispatcher or MDC. In the case of assigned units, the display may show any alert timer, the CFS type, and priority.

Examples include arrived on scene, available, unavailable, and unavailable but assignable. More status types should be configurable.

### Enter Supplemental Service Record

A record of supplemental service request is established to reflect the instance of the selection from the service rotation list. This triggers the rotation to the next resource in the rotation. The rotation occurs regardless of the resource ability to respond to the request.

### Maintain Status

Information is continually displayed in CAD to reflect the current status of units that are monitored by the dispatcher.

### Notify Supplemental Resource Service

The supplemental resource will be contacted to provide dispatch information by the dispatcher and will be provided information about the incident to which they are requested to respond. The availability of the service to provide services will be recorded. A supplemental service that cannot be contacted or informs the agency of their inability to respond within a prescribed time is considered unavailable to provide the service. A supplemental resource will be selected from the list until one is found that is available.

### Override Resource Requirement

The initial recommendation based upon known criteria may be adjusted based upon additional information that becomes available, such as learning that the suspect is known to be armed and dangerous. Override must be recorded.

### Place Call on Unassigned Status

The unit is reassigned to a new call and automatically unassigned from the previous call.

### Reassign to Available

When a unit has cleared from a scene and is no longer assigned to the CFS, the unit will be reassigned to an available status. Data received from MDC transmissions may update CAD and reflect the new status of the unit. The unit may remain on scene and have an available on-scene status.

### Recognize Acknowledgement

The unit assigned to the call will respond to the dispatcher to confirm receipt of the dispatch information. This may be done by voice communication or through mobile data computers.

### Record Arrival on Scene

Units responding to the scene communicate to dispatch that they have arrived at the location. This communication may occur verbally or through an MDC transmission that

may automatically update CAD to reflect the current status of the responding unit, including time of arrival on scene.

There may be a need to record multiple arrival times; an example would be the arrival at the location and another arrival at the scene. For example, a unit may arrive at the location of a high-rise building and at a later time will arrive at the scene located within the building. The system should provide for the setting of different timers based upon time of arrival type.

### Record CFS Activity
The CFS record will be updated to associate the unit or units dispatched as responding units to the call.

### Record Disposition
Record the disposition of the call for service. This may include a narrative in addition to the type of disposition.

### Record Unit Activity
The unit status will be updated to associate the dispatched unit or units with the CFS, including location and time.

### Record Unit Location
Any change in unit location is captured along with time stamps, including changes of location associated with the same CFS.

### Reopen CFS
An existing CFS is reopened for update. Changes are traced for audit purposes.

### Request Supplemental Resource
A law enforcement official requests that a supplemental resource service be dispatched to a specified location.

### Retrieve Alarm Location
Obtain the location of an electronic-generated call from the call source information. Location and contact information from electronic sources may be received from data exchanges to CAD or may be obtained from a database of common addresses maintained by the agency.

### Retrieve CFS From Call Pending Queue
The next CFS on the call pending queue is retrieved. The call will contain all information collected during the call up to the point it is retrieved. Additional information may continue to be added to the call by call takers and dispatchers while the CFS is open.

Calls in the queue are stacked by agency-defined priority, often based on SOP. The CAD system allows the agency to determine the sort order of the call pending queue.

### Retrieve Incoming Call
Incoming calls by phone are answered in the order that they come in. Calls from the 911 system are given a priority over calls from direct phone lines. The center's operating procedures will determine whether any call is allowed to go to voice mail or be put on hold.

### Retrieve Person Information
Person information may include history, protection orders, warrants, mental or health issues, gang information, sex offender registry information, etc.

This could be automatically queried based upon information entered into fields, if available.

### Retrieve Premise Hazard and History
Relevant historical and tactical information about specific and neighboring premises is obtained from internal and/or external sources for decision support. This information may include information about previous calls for service at the premise, whether the premise has records of registered firearms, hazardous materials stored at the site (usually business sites), serious medical information concerning individuals residing at the premise, and other relevant information.

### Retrieve Resource Recommendations
Resource recommendations are initially determined based on the call type, priority and location information, and other characteristics of the specific CFS. The call type and priority level are used based on agency policy and procedure. The dispatcher must review resources recommended by the system. In selecting appropriate resources, the dispatcher may consider a number of factors, such as proximity to the call location, number of units available, special skills or equipment, and the number and type of other CFS to which officers are responding. These factors may or may not have been considered in the initial system recommendation.

### Retrieve Supplemental Resource Rotation List
The agency will obtain the contact information from the system in order to contact and request service from the next eligible service. The system may provide a list of one or more services. This could be based on geographical requirements.

### Retrieve Vehicle Information
This includes any pertinent information about a vehicle. This could be automatically queried based upon information entered into fields, if available.

### Review Call Background Information
The information associated with the location and /or affiliated person is considered to determine whether the recommended resources are adequate. The decision to override the resource requirement should be made if it is determined that the recommendation is inadequate.

## Send Data to RMS

Call history (complete details on closed calls) is typically maintained in a CAD system for a relatively short time frame. While in CAD, the CAD system provides access based on a series of retrieval keys and/or parameters, including but not limited to call number, location, date/time range, etc. Call history applies to the complete call, including initial call information, unit assignments, status changes, imbedded inquiries and responses, triage requests and results, comments, cross-references, etc. In other words, it contains everything that was recorded during the taking and handling of the CFS.

Long-term storage of call history records is normally relegated to either an RMS or a stand-alone calls for service system. The CFS history system is used for data look-up and information retrieval, plus it supports extended statistical processes based on types of events, times to respond, calls by area, date/time, and so on. Because of the need for statistical analysis, call history data needs to be structured so as to facilitate identifying specific types of data, such as events and associated dates and times.

## Take Caller Data

The call taker requests basic information of the caller. Many 911 systems provide information about the phone account (ANI) originating the call, which may or may not be verified immediately, depending on the nature and priority of the call.

The basic information needed to open and initiate a CFS is the type of call (nature of the complaint), the priority, and the location of the CFS. Depending upon the priority of the call, when basic information has been entered, the CFS can be routed to the appropriate dispatcher for handling.

## Timed Alerts

The system must be able to alert the dispatcher to the expiration of the timer associated with any status change. The alert to the dispatcher may be in the form of a tone and/or a visual prompt. This should be configurable based upon the type of CFS. The system should record the acknowledgement or action of the dispatcher in response to the prompt, which will automatically reset the timer.

## Transfer Basic Incident Data to RMS

Basic incident data that can be modified will be transferred to the agency records section for its use. It will be transferred in an editable format.

This function relates to the transfer from CAD to RMS of the CFS data elements normally contained in a law enforcement incident report. In fact, the Justice XML reference document for a law enforcement incident report should provide an excellent standard for the transfer.

The following are examples of the types of data found in an incident report: report number, CAD call type, nature of call, date/time of call, location of incident, and persons and vehicles involved. The CAD CFS number should be included to provide a cross-reference between the CFS and the subsequent incident report.

Incident transfer is normally triggered and takes place automatically. Within the framework of this standard, it would happen (optionally) as an incident report number is assigned and at the time of final disposition of the CFS. The CAD systems should include a feature whereby administrative commands can be executed to transfer either a specific incident or a series of incidents based upon parameters.

## Update Assigned Resources

When required resources for the call have changed, this will be adjusted and recorded on predetermined criteria.

## Update CFS Data

Information related to an open call will be updated as information becomes available. Multiple callers provide potential witnesses to the call and may provide additional or supportive information. This may result in reclassification and prioritization of the call. The dispatcher will need the ability to enter narrative data at any time prior to closing the CFS.

## Update Call Status

The status of the call is updated as new information is received. This should include updating the reported CFS type to the actual CFS type. For example, once the immediate incident is resolved, the responding unit will communicate to the dispatcher that the scene is secured.

## Update Supplemental Service Record

The supplemental resource response will be recorded in the system to reflect the services provided.

## Update Unit Status

Information is continually updated in CAD to reflect the current status of units that are monitored by the dispatcher.

## Verify Location

The caller location will be checked against current address listings in the system. Locations that are not verified provide an indication to the call taker that information received may be inaccurate, providing additional information for the dispatcher to relay to the responder.

The location format can be a street address (blockface address), intersection, or common place name. Location information for a common place, such as the City Hall, has a street address listing cross-reference that will provide the legal street address. Information will be contained in a

geofile, which must include latitude and longitude. Altitude would be optional.

The geofile will:

1. Validate that the street name is an actual street in the service area.
2. Resolve ambiguities while accounting for spelling variations and duplications.
3. Validate intersections.
4. Validate address range.
5. Relate common place names to actual addresses.
6. Relate X/Y/Z coordinates to an actual address.
7. Transform latitude and longitude to map coordinates for display.
8. Translate call location to agency reporting area.
9. Translate alias names to actual street names.

# Properties: Actor

### AVL
The CAD system will accept input from an Automatic Vehicle Location system. CAD converts the vehicle geographical location (e.g., XY coordinates) to a street address, records the vehicle location in the unit history, and automatically performs a change location for the vehicle, if necessary.

### Alarm
Business alarm or other optional interface provides data only.

### Alarms
The CAD system can automatically recognize and accept notification of a business alarm. The system coordinates the alarm input with a key-holder to present information to the call taker. Based upon business rules, the call taker can accept the alarm call and generate a call for service or manually handle the call.

### Call Taker
Any individual employed or contracted by the agency that is designated the first point of contact with the agency. In most agencies, this will be via a 911 emergency services system or the law enforcement officer initiating the call.

### Caller
Any individual or electronic monitoring and notification system establishing contact with the law enforcement agency for the purpose of communicating. This communication may be a call for service (CFS), to notify or provide information regarding an event in progress, or for other business-related purposes.

### Clock Synchronization
Interface and synchronize all servers and CAD workstations with the Master Time Clock (Netclock). This ensures that each workstation and server provides an accurate time stamp.

### Dispatcher
Agency official responsible for the deployment of resources in response to calls for service.

### E911
This interface imports subscriber information (ANI and ALI) for each E911 caller, as provided by the telephone company, into CAD-compliant entry process, eliminating the need for redundant data entry. As an option, the E911 data can be simultaneously imported into the mapping system for immediate centering and display.

### E-Mailing
The CAD system will automatically format and send an e-mail for selected CAD calls and dispatches. A dispatcher may initiate an e-mail for any call/CFS. The information sent in an e-mail is configurable by the agency but generally contains the call information or a list of open calls meeting certain search criteria. There is an administrative mechanism to define e-mail groups.

### Emergency Operations Center
A location where emergency incident management takes place requiring incident and unit status information from CAD. Control of specific units may be relinquished to the EOC.

### External Agency
A high-level representation of any local, state, federal, or county agency external to the law enforcement agency.

### External CAD
CAD systems between jurisdictions must be able to send/receive data to facilitate dispatching of services defined in jurisdictional service agreements. This integration includes the ability to receive event data and/or transmit event data.

### External CAD

The CAD will act as a peer in a multi-CAD environment. The CAD system will accept a new call for service from a participating CAD system, in an agreed-upon structure. The CAD system can generate and transfer a request for service to a peer CAD agency. The CAD system logs all communication between peer agencies. The external CAD system may be other public service or safety systems.

### Faxing

The CAD system will automatically format and send a FAX for selected CAD calls and dispatches. A dispatcher may initiate a FAX for any call/CFS. The information sent in a FAX is configurable by the agency but generally contains the call information or a list of open calls meeting certain search criteria. There is an administrative mechanism to define FAX groups.

### GIS

Interface with city/county GIS to support maintenance of a CAD map; the law enforcement map layers, such as reporting districts/areas; and the creation of the CAD geofile.

### Internet Call Generation

The CAD system will accept nondispatchable calls across the Internet. Calls accepted across the Internet will be of a general nature where a case (report) number may be needed for insurance purposes. The case number is generated and recorded. The call is recorded in the calls for service for statistical reporting.

### Media

Media sources that have the ability to alert the public of critical situations or other more specific alerts.

### Messaging System

The messaging system is often provided through a messages switch that can be interfaced to the CAD system. The messaging system supports unit-to-unit messaging and unit-to-dispatcher messaging via the MDT system. Optionally, the messaging system may also support external messaging to other agencies.

### Mobile Data

Mobile terminals in law enforcement vehicles provide an extension to the CAD dispatch services. The CAD system must interface with one or more mobile communications infrastructures to which the mobile units are attached. The CAD system can provide silent dispatch orders to a mobile unit, in addition to providing the unit with details of the call and premise history information. The mobile unit can change its status, query CAD information, and query local and national databases, such as wanted-person checks.

### Mobile Mapping

Dispatch information sent to the mobile can be mapped on the mobile itself. The map may provide the unit with driving instructions to the location.

### Paging

The CAD system will automatically perform an alphanumeric page for selected CAD calls and dispatches. A dispatcher may initiate an alphanumeric page for any paging group. The information sent in the page is configurable by the agency but generally contains the call number, type of call, and location of the call. There is an administrative mechanism to define paging groups.

### Prearrival System

The answers to the questions posed by the call taker in a prearrival system are written to CAD record of the call. Based on the capabilities of the prearrival system, the call taker may be prompted by the prearrival system based on the CAD call type.

### Push-to-Talk

Import and display in a marquee fashion the radio ID (and optionally the Officer ID) information to the dispatcher by those keying mobile radios.

### RMS

Whenever a case (report) number is generated for CAD call for service, a basic set of CAD information is extracted and transferred to the RMS system to create the RMS incident shell. In addition, the CAD system may inquire into the RMS data files (e.g., master name index, master location index, warrants, and protective orders) for information that relates to the call.

### Real-Time Mapping

Using the city/county GIS information and the law enforcement map layers, the dispatcher has a tactical view of the city and/or dispatch area. The map can be controlled by specific CAD commands, such as zoom-and-pan, or preset commands, such as zooming to the address of a selected call for service. The dispatcher can map/view all units and open calls for service for an area or the city. Units and calls are labeled on the map.

### Resource Scheduling System

A scheduling system provides the ability for the agency to schedule personnel, including communication center personnel and officers. Typically, the system has the ability to factor in many of the department rules for scheduling personnel for regular assignments and for overtime. The interface with the CAD system may include the ability to have one point of maintenance for the names and assignments of all personnel. An interface may also include the roll-call list for each shift change for the dispatcher review and confirmation as units log on to the shift.

## Reverse 911

This capability is typically a part of the telephone system used in the communication center.  The system maintains a list of all callers who have elected to be a part of this community alert system.   An information message can be created.  The system then calls every person on the list and plays the voice message.  There is usually not actually an interface between the CAD system and the Reverse 911 system unless the call list is maintained in the CAD database.  The Web interface is required to provide citizens the ability to add their name to the call list.

## System

The CAD and RMS systems.

## System Administrator Telephone Reporting Unit

An agency may employ a telephone reporting unit that takes incident reports without requiring dispatch resources.

## Unit

An identifier is assigned to the car that will be used to identify the vehicle throughout the shift.  Dispatchers will know the specialty of the unit (e.g., evidence tech, K-9 unit).  A unit may initiate a call either by observing and reporting an incident to the dispatcher or by placing the unit on a call, such as a traffic stop.

# Properties: Business Function

## CAD System Administration

System administration encompasses a wide array of general requirements that law enforcement agencies need from CAD systems in order to be able to query information effectively; ensure appropriate access to information and systems security; and ensure effective information, image, and document management.

There are several distinct requirements associated with system administration:

1. Table maintenance
2. Security and data management
3. Geofile maintenance
4. Error logging
5. Customization

## Call Management and Management Reporting

Command must be able to generate reports and manage the workflow of the call takers and dispatchers in the dispatch center.

## EMS Dispatch

This represents the EMS Dispatch subsystem of CAD.

## Fire Dispatch

This represents the Fire Dispatch subsystem of CAD.

## Intelligent Transportation

This represents the Intelligent Transportation subsystem of CAD.

## Interfaces

CAD systems will interface with one or more systems, some of which are considered more essential than others. Factors such as agency size, number of sworn officers, agency budget, and unique community factors will affect whether agencies wish to adopt these optional interfaces.

## Law Enforcement Dispatch

Law enforcement agencies use CAD to facilitate incident response and communication in the field. CAD systems, in many cases, are the first point of entry for information coming into the law enforcement system. Typical CAD system functions include resource management, call taking, location verification, dispatching, unit status management, and call disposition. Additionally, mapping functionality, interface with mobile data computers (MDC), and interfaces with other external local, state, and federal information systems may be included. Call takers, dispatchers, and their supervisors are primary users of CAD. Units in the field may interact via mobile data computers.

## Support Services

In addition to the handling of calls for service, the CAD system should support the effective management of the available resources. The need for the optional items will be based on the agency size, the population served by the department, and other aspects of the specific department or departments served by the CAD system.

# A

# Properties:  State

### Active Call for Service
A CFS was created in CAD and is currently active.

### CFS Resource Assigned
Resources appropriate for the CFS have been determined and assigned.

### Call Closed
Record the disposition of the CFS.

### Call Monitored
Dispatchers monitor the CFS as it unfolds to ensure that adequate resources are available to secure the scene and ensure public safety. Dispatchers also act on requests for resources that are received from the scene.

### Resources Dispatched
The completion of assigning appropriate resources to a CFS.

### Routed
Information in voice, paper, or electronic form was recorded and sent or distributed to intended recipients.

### Status Recorded
The status of the unit is recorded in the CAD system.

### Supplemental Resource Dispatched
A supplemental resource was contacted with dispatch information and confirmed their availability to provide the service.

### Additional Interfaces
It is often desirable to have a direct interface between the CAD system and other key law enforcement systems, such as other CAD systems in the area, RMS systems, alarm systems, and mobile data terminals.

CAD to CAD.  The CAD will act as a peer in a multi-CAD environment.  The CAD system will accept a new call for service from a participating CAD system, in an agreed-upon structure.  The CAD system can generate and transfer a request for service to a peer CAD agency.  The CAD system logs all communication between peer agencies.

Mobile Data Terminal (MDT).  Mobile terminals in law enforcement vehicles provide an extension to the CAD dispatch services.  The CAD system must interface with one or more mobile communications infrastructures to which the mobile units are attached.  The CAD system can provide silent dispatch orders to a mobile unit, in addition to providing the unit with details of the call and premise history information.  The mobile unit can change its status, query CAD information, and query local and national databases, such as wanted-person checks.  The queries may not go through CAD but may be part of a separate mobile system.

Prearrival Instruction System.  The call taker answers to the questions posed by a prearrival system are written to CAD record of the call.  Based on the capabilities of the prearrival system, the call taker may be prompted by the prearrival system based on the CAD call type.

Alarm.  The CAD system can automatically recognize and accept notification of a business alarm.  The system coordinates the alarm input with a key-holder to present information to a call taker.  Based upon business rules, the call taker can accept the alarm call and generate a call for service or manually handle the call.

RMS.  Whenever a case (report) number is generated for a CAD call for service, a basic set of CAD information is extracted and transferred to the RMS system to create the RMS incident shell.  In addition, the CAD system may inquire into the RMS data files (e.g., master name index, master location index, warrants, and protective orders) for information that relates to the call.

A discussion of the business functions and situations that warrant CAD - RMS interface is explored in the LEITSC RMS functional specifications.

### Administration Interfaces
The Administration CAD interfaces assist the law enforcement team of units, dispatchers, call takers, and command in working together.  The key interfaces include Push-to-Talk, master time interface, and Resource Scheduling System:

Push-to-Talk.  Import and display in a marquee fashion the radio ID (and optionally the Officer ID) information to the dispatcher by those keying mobile radios.

Interface and synchronize all servers and CAD workstations with the Master Time Clock.  This ensures that each workstation and server provides an accurate time stamp.

Resource Scheduling System.  A scheduling system provides the ability for the agency to schedule personnel, including communication center personnel and officers.  This system is often found in the agency RMS.

Typically, the system has the ability to factor in many of the departmental rules for scheduling personnel for regular assignments and for overtime.  The interface with the CAD system may include the ability to have one point of maintenance for the names and assignments of all personnel.  An interface may also include the roll-

call list for each shift change for dispatcher review and confirmation as units log on to the shift.

## BOLO

BOLO (Be on the Lookout) can be an optional part of a CAD application or a part of an RMS system. BOLOs in CAD are created and maintained in a data file in CAD. These may be entered by a dispatcher or may be created by anyone who has been given the required security clearance to create or maintain the file.

Both an RMS interface and the mobile data terminal interface should support the creation and transmission of a BOLO. A BOLO should be assigned an expiration date, either by the person who creates it or by the system, based on department policy and available system resources. A typical BOLO file would include the nature of the BOLO, priority, date, range of effectiveness, subject person and subject vehicle information, and contact information. There should be a mechanism to search the BOLO and to print it in a report and to purge the BOLOs out of the date range.

## CAD Catch-Up

The ability to recover from the interruption of CAD services, allowing the agency to enter activity data performed during the interruption of service.

## CAD Management Reporting

It is essential that the CAD system include standard reports that can be run using flexible parameters. New reports should be defined either through the CAD system or a third-party reporting tool and then be stored as a standard report available through the CAD system.

The functionality needs to include the ability to report any data element by any other data element in the system. This may include the ability to export data for use in third-party tools. A wizard may be provided that allows for user-generated reports.

Examples of typical CAD reports include the following reports that can be run by any user-defined date and time range:

1. Daily log showing all calls received for the prior 24 hours from time of printing
2. Activity Analysis by specified geographical area and by time period
3. CFS Summary by specified geographical area and by time period
4. Activity Analysis by day of the week
5. Activity Analysis by hour of the day
6. Activity Analysis by day and hour

7. Response Time Analysis by specified geographical area and by time period
8. Response Time Analysis by call type
9. Time Consumed by call type by hour of the day
10. Workload Activity by resource
11. Workload Activity by group
12. Time Consumed by day of the week and hour of the day
13. Time Consumed by specified geographical area and by time period
14. Attempted breaches in security
15. Error messages by type for identifying system problems

Customizing reports to meet department needs should also be an option.

## Call Disposition

A call taker may close a CFS that does not require the dispatch of resources.

A CFS will be closed when the units at the scene have completed the assignment. Depending on the agency SOP, the primary unit may close the call with a status. The dispatcher is notified by assigned units of their status change using voice or mobile data computer (MDC) transactions. MDC transactions may update the CAD to record the unit status and close the CFS, if the data received indicates the CFS is complete. The CFS will be classified with a specific disposition, generally provided by the primary unit.

When a call is closed, information collected during the CFS may be automatically transferred from the CAD system to the records management system (RMS). Any updates made by the CAD operators on reopened calls will be automatically transferred to RMS, subject to agency policies.

In instances where a duplicate call is identified, one call is disposed with a cross-reference to the original CFS. The calls will be linked for future retrievability.

## Call Management

The call is managed by continually updating the CFS data with any additional information reported by callers or officers on scene. The resource recommendations may be revised based on additional information and may be added or reassigned.

## Call Taking

Calls for service (CFS) initiate the CAD process. Callers are citizens or other agencies requesting services from the agency or giving notification of events or activities of concern. A CFS may come from many different points of

origin such as alarm systems, E911 systems, direct calls (7- or 10-digit numbers), walk-ins, CAD-to-CAD interfaces or Web-based systems.

The service requested by callers will consist of both emergency and nonemergency priorities. Call taking consists of receiving the call, obtaining sufficient and accurate information from the caller, determining whether this is a duplicate of a call in progress, and recording or updating the CFS in the CAD system. The call taker may also apply procedures and guidelines to verify, analyze, classify, and prioritize the call prior to routing the CFS to the dispatcher. A CFS may also be generated by a unit in the field. The unit can contact the dispatcher or the call taker, or he may actually create the call electronically using the optional MDT interface.

A CFS may be forwarded to a telephone reporting unit and be received from the telephone reporting unit.

This may include the ability to create a CFS for future scheduled events.

## Communication Center Relocation
The support of an emergency that requires that the dispatch center be moved to an off-site secure location must include a hardware system and network connectivity that will support the creation of an off-site, real-time backup server at the relocated communication center.

## Communications Interfaces
There are several communications-based interfaces that allow CAD-generated information to be transmitted to others via e-mail, messaging, and the Internet.

Internet Call Generation. The CAD system will accept nondispatchable calls across the Internet. Calls accepted across the Internet will be of a general nature where a case (report) number may be needed for insurance purposes. The case number is generated and recorded. The call is recorded in the calls for service for statistical reporting.

Messaging System. The messaging system is often provided through a messages switch that can be interfaced to the CAD system. The messaging system supports unit-to-unit messaging and unit-to-dispatcher messaging via the MDT system. Optionally, the messaging system may also support external messaging to other agencies.

Paging. The CAD system will automatically perform an alphanumeric page for selected CAD calls and dispatches. A dispatcher may initiate an alphanumeric page for any paging group. The information sent in the page is configurable by the agency but generally contains the call number, type of call, and location of the call. There is an administrative mechanism to define paging groups.

Faxing. The CAD system will automatically format and send a FAX for selected CAD calls and dispatches. A dispatcher may initiate a FAX for any call/CFS. The information sent in a FAX is configurable by the agency but generally contains the call information or a list of open calls meeting certain search criteria. There is an administrative mechanism to define FAX groups.

E-mailing. The CAD system will automatically format and send an e-mail for selected CAD calls and dispatches. A dispatcher may initiate an e-mail for any call/CFS. The information sent in an e-mail is configurable by the agency but generally contains the call information or a list of open calls meeting certain search criteria. There is an administrative mechanism to define e-mail groups.

## Configuration
The CAD should be configurable to allow for the enforcement of agency SOPs. Examples would include resource allocation algorithms and dispatch policies.

The system should be configurable to determine screen parameters, color choices, font size, screen layout, and user preferences.

## Dispatch Decision Support
The dispatcher is presented with the recommended resources for the selected CFS, based upon preset criteria for the type and priority of CFS. Further information will be considered, such as the history of the location, suspect, and the possibility that hazardous materials may be involved. The recommended resources may be overridden by the dispatcher based on the additional information or requests by officers on the scene. The system may have the capability to perform dispatch decision support, such as assigning an incident number without human intervention.

Units available will be considered as well as the available unit proximity to the CFS. The final decision is which specific units to dispatch.

## Dispatch Supervisor Support
The CAD system should provide the supervisor with the ability to monitor the activity on any dispatcher workstation. If necessary, a supervisor needs to have the ability to take direct control over a dispatch position remotely, without leaving the supervisor console.

## Dispatch Units
The units specifically recommended or selected for a CFS will be dispatched and their acknowledgment recorded. Other units not dispatched may be notified of an event in progress if the CFS warrants. When multiple units are dispatched, one unit will be designated as the primary responder responsible for the CFS until it is completed.

## Emergency Operations Center

The support of an emergency that requires that the dispatch center be moved to an off-site secure location must include a hardware system and network connectivity that will support the creation of an off-site, real-time backup at servers located at the Emergency Operations Center (EOC). Other functionality that can be provided by the CAD system in support of EOC operation includes remote CAD dispatching capability and support for multiagency event coordination.

These two optional features provide benefits to the CAD system even if the dispatcher does not have to be moved. Multiagency event coordination usually requires that support agreements be negotiated and in place among all of the agencies. Another desirable feature in support of an EOC would be the ability to add additional agencies "on the fly" during an emergency operation.

## Emergency Operations Interface

The operation of an emergency center requires the multidirectional exchange of information between CAD and EOC. Units may be assigned to the EOC, at which point the EOC will take control of the unit until released. CAD will maintain the ability to monitor the unit availability status. CAD will continually update EOC with call information.

## Geofile Maintenance

The geofile is used to validate and standardize location and address information. It is also used to cross-reference addresses and locations with law enforcement-defined reporting areas, X/Y/Z coordinates, ZIP codes, and other identifiers. The geofile contains sufficient information to ensure that an address is valid. Furthermore, it provides cross-references to addresses and locations using common place names (e.g., business names, parks, hospitals, and schools) and street aliases. It includes information such as direction of travel on particular streets and can identify the side of a street for a specific address. It is assumed that all addresses in the RMS are validated using the system geofile.

The reporting area defined above should be used to define beats, sectors, command areas, neighborhoods, communities, etc.

The geofile contains the geographic information that is the basis for many decisions in a communications center. The system needs to provide the ability for an agency to enter and update all geofile data, including the physical address and the X/Y/Z coordinates.

The creation of a comprehensive geofile is a significant undertaking. The system should support the creation and maintenance of the geofile using an available mapping/GIS database. Geofile information in CAD and RMS should be synchronized, based on established parameters.

## Locational Systems Interfaces

Locational systems provide automated access to address, geographic, and mapping information for law enforcement. The primary locational systems include AVL, GIS, and Mobile and Real-Time Mapping:

AVL. The CAD system will accept input from an Automatic Vehicle Location system. CAD converts the vehicle geographical location (e.g., X/Y/Z coordinates) to a street address, records the vehicle's location in the unit history, and automatically performs a change location for the vehicle, if necessary.

GIS. Interface with the jurisdiction GIS to support maintenance of the CAD map; the law enforcement map layers, such as reporting districts/areas; and the creation of the CAD geofile.

Mobile Mapping. Dispatch information sent to the mobile can be mapped on the mobile itself. The map may provide the unit with driving instructions to the location.

Real-Time Mapping. Using the jurisdictional GIS information and the law enforcement map layers, the dispatcher has a tactical view of the city and/or dispatch area. The map can be controlled by specific CAD commands, such as zoom-and-pan, or preset commands, such as zooming to the address of a selected call for service. The dispatcher can map/view all units and open calls for service for an area or the city. Units and calls are labeled on the map.

## Logging

CAD will log all actions including security violations and attempted breeches, errors, changes, and updates. Logs should be viewable and searchable by the system administrator.

## Primary

CAD interfaces considered to be essential for conducting primary law enforcement business functions. The four primary CAD interfaces are with the messaging system, the local RMS, Regional/State/NCIC Warehouses, and E911.

E911. This interface imports subscriber information (ANI and ALI) for each E911 caller, as provided by the telephone company, into CAD-compliant entry process, eliminating the need for redundant data entry. As an option, the E911 data can be simultaneously imported into the mapping system for immediate centering and display.

Regional/State/NCIC. Query to state, local, and national databases. Queries to the state, local RMS, and national databases will occur automatically from selected CAD commands using the messaging system interface. In addition, the operator (e.g., dispatcher or officer) will have the ability to use stand-alone query screens eliminating redundant data entry. Responses to such queries should be stored with the call record.

RMS: See RMS interfaces.

## Public Awareness Messaging

The ability to broadcast, publish, or send messages to individuals or agencies that need to be aware of critical events. Examples include Amber Alert, critical incident occurrences, utilities, transportation, hospitals, or the public at large via the Internet.

Reverse 911. This capability is typically a part of the telephone system used in the communication center. The system maintains a list of all callers who have elected to be a part of this community alert system. An information message can be created. The system then calls every person on the list and plays the voice message. There is usually not actually an interface between the CAD system and the Reverse 911 system unless the call list is maintained in the CAD database. The Web interface is an option to provide citizens with the ability to add their name to the call list, for noncritical incidents.

## Security

Systems should allow tiered access to information based on passwords and other authentication and nonrepudiation practices. Role-based authentication and authorization must be a part of the RMS. Other identification technologies—such as biometrics, ID card, security token, etc.—are emerging standards.

Systems should apply appropriate edits to all entered data to ensure data integrity and maintain activity logs and audit trails.

## Supplemental Resources Tracking

For example, in cases where a vehicle has been confiscated or found to be disabled, the dispatcher needs the ability to request the services of a towing company. This request may be made by company name (owner requested) or by rotation. In cases where the owner does not have a preferred company, the system will select a company from the towing rotation. A towing rotation prevents any one company from being favored over another.

If resources other than those recommended by the rotation are selected, the system should capture the reason for the exception.

## Table Maintenance

The flexibility needed in a CAD system requires that the data used to support system recommendations or decisions be maintained in tables that can be supported and changed by the agency. Each department will have their own set of Standard Operating Procedures (SOPs) that must be followed with regard to table maintenance.

In addition, the CAD system must be flexible enough to allow the system setup to reflect the SOPs at the time the system is initially installed and to be changed when the department SOPs change. SOPs are typically defined and maintained in a separate document, or they may be available for reference online as a CAD help file.

Examples of common tables include but are not limited to:

1. Units
2. Call types and priorities
3. Unit Status Types; e.g., assigned, unassigned, or assigned but available
4. Personnel, including emergency contact information and current assignment
5. Service providers
6. Patrol and command area definitions
7. Timers
8. Commands

## Training and Testing

This function relates to the necessity of having a region on the CAD system that is isolated from the production environment for the purposes of program testing or file maintenance testing, as well as training of new personnel. This function may be referred to as a CAD training mode.

To the greatest extent possible, the training environment should be identical to the production region, thus allowing accurate testing and training to occur without impacting the production environment. The following are examples of the types of items to include in the training environment:

1. Definition of the types of agencies being utilized; i.e., Law, Fire, EMS
2. Tables defined to include unit names, recommendation patterns, premise information, personnel information, security permissions, etc.
3. Separate test E911 connection or a canned script of E911 information
4. Separate test mobile connection or a canned script of mobile information
5. Access to audible radio transmissions

The training environment should have its own start-and-stop sequence that is independent of the production

environment.  The training environment does not have to be active at all times and can be started as needed.

By having the training environment established and defined, the agency can develop a robust training program that simulates the live environment to include the associated interfaces and radio traffic.  The personnel can enter incidents and "mock" live incidents that are occurring on the radio without the production environment data being affected.

Additionally, any programmatic change or changes to file maintenance records can be thoroughly tested and any issues resolved prior to being implemented in the production environment.

## Unit Status Management

Unit status must be continually monitored, updated, and recorded by the dispatcher.  This information may be made available by voice communication or through mobile data computers.  In addition to recording the unit status and destination, the CFS number and times (action) will also be recorded by the system.  The recording of status changes is representative of a unit's work activity during a time interval.  This information is essential to running standard CFS reports.

The system should maintain the elapsed time between status changes/checks and alert the dispatcher when agency-defined thresholds are met.

# Acronyms: CAD

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| **ALI** | Automatic Location Identifier |
| **ANI** | Automatic Number Identification |
| **AVL** | Automatic Vehicle Location |
| **BOLO** | Be on the Lookout |
| **BJA** | Bureau of Justice Assistance |
| **CAD** | Computer Aided Dispatch |
| **CFS** | Calls for Service |
| **E911** | Enhanced 9-1-1 |
| **EMS** | Emergency Medical Services |
| **EOC** | Emergency Operations Center |
| **FAX** | Facsimile |
| **GIS** | Geographic Information System |
| **Global JXDM** | Global Justice XML Data Model |
| **IACP** | International Association of Chiefs of Police |
| **ID** | Identification |
| **IJIS** | Integrated Justice Information System Institute |
| **LEITSC** | Law Enforcement Information Technology Standards Council |
| **MDC** | Mobile Data Computer |
| **MDT** | Mobile Data Terminal |
| **NIJ** | National Institute of Justice |
| **NOBLE** | National Organization of Black Law Enforcement Executives |
| **NCIC** | National Crime Information Center |
| **NSA** | National Sheriffs' Association |
| **PERF** | Police Executive Research Forum |
| **RFP** | Request for Proposal |
| **RMS** | Records Management System |
| **SOP** | Standard Operating Procedures |
| **TDD/TTY** | Telecommunication device for the hearing- and speech-impaired |
| **XML** | Extensible Markup Language |