

16e.Premier CAD Computer Aided Dispatch System

16e.2.1 Premier CAD Overview

Motorola's Computer-Aided Dispatch System (Premier CAD) computerizes public safety dispatching functions. This technology allows calltakers and dispatchers to quickly and efficiently handle incident information, thus increasing officer safety and the potential for saving lives. Premier CAD can function as a stand-alone product or be integrated with other Motorola public safety system solutions such as Infotrak (law records management system), Premier MDC (mobile data computers) and CENTRACOM Gold Elite Radio console.

This system description introduces Premier CAD system features and functionality. This document describes incident screens (such as initiation, dispatch, update, and closure) and unit status, premise, hazard, previous incident, and other incident-related functions. This document explains Premier CAD's pager toning features and e-mail system. Reports, WWVB clock, and Motorola's integrated CAD geographic display Premier ATM (Advanced Tactical Mapping) are discussed in the later sections of this document along with Premier CAD ancillary products: Premier TDD, Premier AWW, and Premier UDT.

16e.2.2 Premier CAD System Elements and Features

Premier CAD is designed to allow rapid incident initiation and easy access to incident information. To accomplish these goals, Premier CAD has divided computer-aided dispatch into three elements: Premier CAD work monitor, Premier AWW status monitors and Premier ATM (Advanced Tactical Mapping). Calls are initiated and dispatched from the Premier CAD work monitor. Status of units and incidents are tracked on the Premier AWW status monitors. Incidents and units are mapped on Premier ATM to provide the dispatcher with tactical information.

Each element has been designed for ease of use with built in features that quickly access and process information to speed emergency response times. Preformatted screens and command line processing help calltakers and dispatchers collect and distribute vital information. User-configurable windows allow users to display information in the agency's preferred format, to highlight priority incidents, and to automatically track incident pending and dispatch times to watch for possible officer difficulties in the field.

Premier CAD workstations may be provided for calltakers, dispatchers, supervisors, and any administrative or remote users desired by the agency. Each workstation is equipped with a Pentium-class PC, one keyboard, one mouse, and one to four SVGA monitors. All three Premier CAD elements may be displayed on the same monitor if the workstation is equipped with only one monitor or on separate monitors if the workstation is equipped with three or

four monitors. Workstations with two monitors are often configured with the Premier CAD work monitor on one monitor and the Premier AWW status displays and integrated CAD geographic display on the other monitor.

In addition to easy to use screens, the system has been equipped with online help that is available to assist the user with Premier CAD information and (optionally) other customer specific information.

16e.2.3 Multi-agency/Multi-jurisdictional System

Premier CAD recommends law units for dispatch based on the method selected in the Agency Parameters file. Recommendations can be based on a unit's geographical assignment (beat, alternate beat, team, area), on a predefined order of recommendation (method "0"), on law unit capabilities, or on a combination of the unit capabilities and the selected recommendation method.

- Recommendation based on geographical assignment is determined when a law unit is signed on or entered on a roll call.
- Recommendation method "0" uses the predefined recommendation order configured in the beat assignment file.
- Recommendation based on unit capabilities is achieved by configuring the incident types, incident responses, and law vehicle files parameters.

When the dispatch recommendation form displays, units that satisfy the recommendation requirement display in the "Rc" field. A dispatcher may use a function key to dispatch the recommended unit(s) or enter the IDs of units not recommended into the "Dis" field.

If more than one unit is dispatched with a single command, the system designates the first unit as the primary unit and any additional units as backups.

To dispatch more units to the same incident, the user types the incident number on the command line and presses the dispatch incident function key. This displays a second dispatch form that shows the units assigned to the incident without dispatch recommendations. The system also supports the ability to request a recommendation for a unique capability (i.e. K9, Crime Scene Investigator).

The dispatcher assigns additional units by typing the user IDs in the "Dis" field(s).

16e.2.4 Premier Graphic Geofile Manager (GGM)

The Premier Graphic Geofile Manager (GGM) provides the public safety computer-aided dispatch/records management professional with an integrated mapping tool to manage all geographic data. The GGM works cooperatively with existing Geographic Information Systems (GIS) and has the capability to display the geofile as a graphic map on a color monitor. The GGM employs pull-down menus for selecting and viewing geographic layers (e.g., streets, city and customer boundaries, beats & zones, common places) at any scale.

Premier GGM performs the following functions:

- Manages one single coordinate-based map file for all Motorola public safety applications - CAD, RMS, tactical mapping, and Crime Analysis.
- Supports public safety applications with a direct interface to the CAD, RMS, and Tactical Map systems.
- Provides analysis tools to determine street address errors such as missing addresses, gaps in address ranges, overlaps in address ranges, flipped address ranges and other logical address errors.
- Presents address errors to the GGM operator for correction.
- Creates or modifies response zones and beats using menu tools that can select geographic features such as streets, rivers, political boundaries, or census tract boundaries and copies those features to the response zone layer.
- Supports a variety of response configurations including police, fire, and EMS as well as districts, beats, and areas. Provides police managers with a tool to respond to new trends such as community based policing; and allows fire managers to create responses based on zones and fire classification schemes (brush, residential, commercial).
- Transfers updates performed on the GGM to Premier CAD as change records (the entire geofile is not transferred) without affecting the CAD or RMS application.
- Allows users to define colors for streets, rivers and lakes, response zones, beats, boundaries, and other features. Common place points are assigned symbols. Maps may be printed on laser printers or other printing devices.
- Includes comprehensive documentation, training, and support provided by public safety mapping professionals.
- Additional Premier GGM functionality includes:
 - The ability to add streets, street address ranges, and common place points.
 - The ability to create and change beats, zones, and boundaries.
 - The ability to transform the graphic map information into a high-speed file which drives the dispatch and record system operations.

Because geofiles typically contain tens of thousands of records, even minor beat or boundary changes can involve the modification of thousands of records. With GGM, changes are made simply by redrawing a boundary. Any records affected by the change are automatically updated by GGM. The addition of a street is simplified by allowing the administrator to draw the new street directly on the map.

Updates from GGM to CAD may be made at the record level. Instead of refreshing the entire geofile when a change is made, GGM allows the administrator to change only the affected records. In most other systems, a change to the geofile requires the system to be halted while the geofile is reloaded. With GGM, all geofile updates occur while CAD is fully operational.

16e.2.5 X,Y Coordinates and ESRI-based Geofile Mapping System

Premier CAD is based on a coordinate-based geofile used for all geofile operations. For instance, whenever an incident is validated against the geofile, its X/Y coordinate is computed and stored as part of the incident record. Subsequent operations with this incident use the coordinate to:

- Search for potential duplicate incidents (using a crow-fly radius search).
- Identify potential hazards.
- Display the incident on ATM.
- Recommend units if CAD is integrated with an AVL system.

16e.2.6 Advanced Tactical Mapping

Advanced Tactical Mapping (ATM) is a tactical map display that has been integrated with Premier CAD to provide a dynamic map that displays location and status for incidents and units. Event information from the CAD server is automatically passed to the ATM screen at each workstation. Messages are sent via an Ethernet network directly to Premier AWW. Premier AWW communicates with ATM via a DDE message. New events from Premier CAD are automatically added to the ATM map and the Important window. Users have an immediate overview of all events and units for that workstation and can adjust the map to scale as necessary.

As an option, ATM can incorporate AVL-based unit location data. The AVL data is displayed on the same ATM map with the incident information. In order to generate AVL data, a message switch, in-vehicle equipment, and communication network are required.

ATM has been designed to support wireless call tracking. As this technology is available, ATM tracks and maps wireless calls.

Event information from the CAD server is automatically passed to the ATM map display at each workstation. Each time a new event message is received from the CAD, ATM automatically adds that event to the map. Each new event that is added to the map automatically appears in ATM's Important window. This allows the dispatcher to immediately visualize the location of new events and their relative proximity to other events. The number of ATM products that can be interfaced to CAD is limited by the network messaging traffic and the number of ATM licenses purchased. The scale of the geographic display can be automatically adjusted such that all events and units for that workstation are displayed in ATM.

By looking at their ATM geographic displays, calltakers and dispatchers are able to see their events. Additional information on events is depicted on the geographic display with symbols, colors, and labels. Each event type in CAD is assigned a symbol for the ATM geographic display. Each event status category in the CAD is assigned a color in ATM. Each event in ATM is labeled with the CAD event ID. All of these items are configurable by the customer.

ATM functions as an add on to the Premier CAD system for the purpose of providing users with a color map display of Premier CAD unit and incident information. ATM provides users with a color display showing units and incidents, their relationships to each other, and their status and other attributes in a map format (Figure 69) ATM is also capable of presenting newly initiated incidents, status changes, and timers. ATM responds to Premier CAD generated map commands which allows users to manipulate the map by zooming into areas for greater detail and moving the map directionally with a pan function.

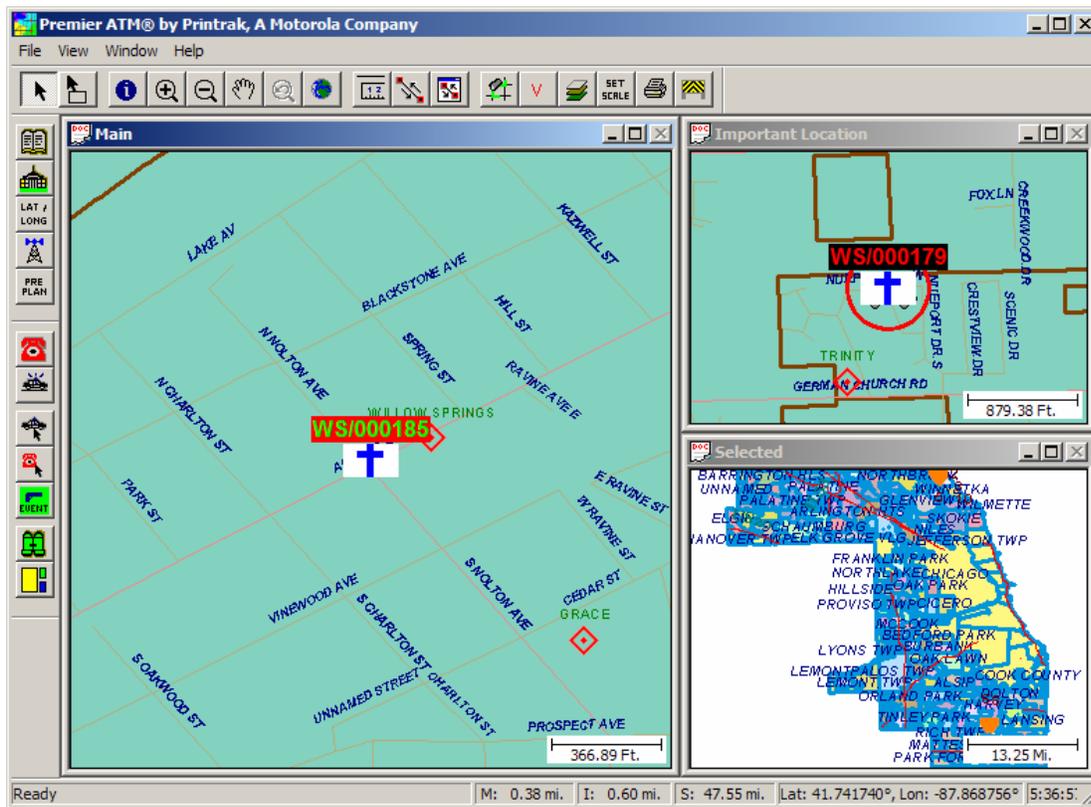


Figure 69. ATM Geographic Display

ATM interacts with Premier CAD in the following manner:

- When the incident dispatch or Incident Update forms are displayed, ATM zooms into the incident based on the settings in the plot database.
- Each unit's status is displayed in ATM as users update units on Premier CAD.
- Users select the display format for incident information on ATM by using the ATM menu selections.
- When the location detail command is used, ATM zooms in on the location.
- Maps may be manipulated using the keyboard or mouse.

ATM allows the user to configure each map layer so that it is visible based upon the scale of the map (zoom layer). ATM also allows the user to make map layers visible or invisible based upon the needs of the user. For instance, if a fire hydrant layer was available, the user might want to make this layer visible if the fire department was having problems finding a suitable hydrant near the site. This configuration system is extremely easy to use. ATM has a Find Address command that allows the user to enter an address and the address is displayed on the map.

This configuration allows each ATM user to control their own ATM and geographically focus on their assigned area of responsibility. This configuration provides each dispatcher with their own tactical map display and enhances the overall effectiveness of dispatch operations.

16e.2.7 Advanced Workstation for Windows (Premier AWW)

Premier Advanced Workstation for Windows (Premier AWW) allows the communications center workstations for calltakers, dispatchers, and supervisors to be configured to match the center's operations. This innovative environment supports user-defined windows for dynamically updated views of ongoing incident and unit activities.

Premier AWW status monitors may be defined by the user to meet the specific needs of an agency's communications center. A user can define from one to sixteen separate window views, which can be shown on a single VGA monitor or spread across from two to four monitors. Flexibility in configuring the windows reduces the long-term ownership cost of Premier CAD and increases Motorola's ability to deliver a customer view that is responsive to an agency's operational needs without requiring to do custom programming.

System users create status monitors through Premier AWW using a series of windows that allow the user to choose the types of information displayed as well as the order in which the information is displayed. The user determines what information is displayed and how that information is displayed, including sorting, number of rows and columns, size of the window, placement of a window, font sizes, and titles. The display options allow status codes and screens to be color-coded. The display colors for the status code, foreground, background, and time foreground are all definable.

Status codes can be defined with a color scheme for normal and timed-out display. This allows a dispatcher to key on a unit's status for proper safety updates. For example, if a unit is in an arrived status, the unit status monitor could show a display of black letters on blue background. That unit's time-out value could be displayed in yellow letters on a red background to alert the dispatcher to make radio contact for a status update. The dispatcher can then update the status back to a normal status, which changes the color.

The following list describes some of the features offered by Premier AWW:

- The application supports an unlimited number of unit and incident status monitors and pending queues. They may be placed anywhere on the screen and can be minimized and maximized using single keystroke entries.
- The status monitors and pending queues are displayed as multi-column tables in a scrollable (horizontally and vertically) list box. Windows may be defined as row or column major.
- User agencies can configure unit status, incident status, and pending queues to display selected data fields in a certain order.
- Users determine the sorting of the unit and incident status monitors and pending queue. Fields may be sorted in ascending or descending order. The sort criteria are separately defined for each view.
- The display of information in a status or pending incidents window may be further defined by the use of filters. Filters suppress the display of certain data depending on the criteria set by the user.
- The user may select which areas to display on the unit status monitor and may choose whether or not to display the units assigned to an incident when viewing the incident status monitor.
- A counter is provided for each window to show the number of incidents pending or number of other items in a particular list.
- The user may “point and click” using the workstation mouse on any incident or unit displayed in any of the status monitors and a dialogue box appears with detailed information for that unit or incident record. The user can also access a CAD Update, Recall or Dispatch form from this dialogue box.
- In addition to command-line-based dispatching sent to CAD via the F10 function key and mouse-based point and click dispatching, Motorola Premier AWW users have the ability to dispatch via “drag-n-drop.” Drag-n-Drop is accomplished via a transaction directly from AWW to the CAD system. Users have the ability to utilize the mouse cursor to point to a unit displayed in a Unit Status Window, click on the unit, and drag it to a pending or active incident. AWW generates a transaction to the CAD application on the Tandem, causing the unit to be dispatched to the event.
- The system supports "paging" among defined windows through the assignment of keyboard commands.
- In the event that a unit activates the emergency key on a Mobile Data Terminal (MDT) or portable radio, a bright red emergency dialogue box displays on the status monitor of the dispatcher(s) controlling that zone. This occurs regardless of whether the unit is currently displayed in a view.

- An optional Push-to-Talk (PTT) ID window provides a scrollable list box with channel, unit ID and time stamp. Up to 20 PTT ID entries per view are available. This optional feature may be used in conjunction with the portable radio interface to display PTT receipt from the radio system.
- Commands and Unit Status codes can be configured to be accessible from AWW for a more mouse driven operation. Right click on a Unit in the Unit Status Monitor enables the user to change the unit's status with a simple mouse click.

Example:

A supervisor who wishes to see only those units assigned to incidents may create a new status monitor window labeled "Assigned Units" to display only units with an assigned status. The window may be further customized to display only the unit number, status, incident type, and assigned address. Supervisors can also create a custom window to view just the pending priority one and two incidents.

Users may also define filters for information. Each agency defines its own unit status monitor display through Premier AWW in the following order:

- Unit ID
- Unit flag
- Stacked calls
- Unit status
- Time at status
- Incident type
- Incident number
- Address

Users can also determine or change a unit status with Premier CAD commands. The Display Status command displays the unit status for all areas assigned to a user, jurisdictions of the working agency not in the user's coverage, and jurisdictions in a different agency.

Each agency defines its own incident status monitor display through Premier AWW. Many agencies choose to configure theirs with the following information:

- Comment flag
- Agency
- Area
- Status

- Priority
- Number
- Type
- Location
- Caller location

16e.2.8 Premier CAD-DSS (Decision Support System)

The CAD-DSS (Decision Support System) application allows agencies to access the potentially massive amount of incident data related to fire, medical, and law incidents through the Premier UDT application and view that data in a meaningful way. CAD-DSS provides the user with a completely customizable decision support capability without the need for programming and allows users to output queries into report formats, charts, and graphs. An agency can use CAD-DSS to create and store commonly used reports, complex queries, and management and statistical reports.

Results from these queries can be formatted into a user-customizable report. For instance, a dispatch supervisor may have an interest in the response times for all fire incidents dispatched in the last month. The supervisor can easily structure the query of interest through the graphical interface, customize the results to be presented in a report (complete with agency graphics and formatting), and schedule the query and report.

The CAD-DSS product has been developed utilizing Hummingbirds™ BI Query and BI Broker products. This application allows end users to query CAD data, which makes data viewing simple and intuitive, without impacting CAD system performance. Using a graphical interface, users can also create their own unique queries and reports. For instance, these queries and reports can be scheduled such that the system completes a query overnight and provides a report that will be at the user's workstation the next morning. The CAD-DSS product also has a security capability that limits access to data as required.

The CAD-DSS product is highly customizable and configurable. Additionally, Motorola can provide consulting and development services for agencies that have unique customization requirements, but do not have the staff to develop these requirements. In either case, the application allows the customer or Motorola personnel to rapidly add or enhance the product to meet unusual or unique requirements.

16e.2.9 Open Query (OQ)

Premier OpenQuery is designed primarily as a tool for querying external data sources, such as government law enforcement agencies. However, OpenQuery's abilities are not limited to the querying of just these agencies. It can be used to query many other accessible data sources, both internal and external to the agency. Premier OpenQuery can be used with Premier CAD or as a stand-alone system.

Users create queries by entering query criteria in the agency configure forms. Users then send the queries to selected external data sources. The data sources return replies to the queries which are then directed to either the OpenQuery client, CAD client as an email message, or both. Both queries and replies are logged and can be viewed in Premier OpenQuery.

16e.2.10 Universal Data Transfer (UDT)

The Premier Universal Data Transfer (UDT) system transfers records from Premier CAD on the Compaq Himalaya and formats the data in a MSSQL database so that other applications can use the data to generate statistical reports about CAD activity, while eliminating the risk of any performance impacts on the CAD system. Records from the following logs are transferred:

- Event
- Audit
- Configuration Database
- 911 Calls
- Tow Vehicle (Support Equipment)

After the data is transferred to UDT, it is parsed out of its textual format and placed into relational database tables. This parsing gives incidents and units attribute values. For example, a unit is assigned different statuses to describe what the unit is doing, such as dispatched, enroute, or arrived. Included with the status is the date and time that the unit changed to the status. UDT calculates how long a unit is in each status so that statistics can be easily obtained.

From the UDT server, the data can be imported to other Windows applications, databases or external networked computer systems. Premier UDT allows access to the CAD incident and unit records as needed, by users for statistical and administrative reporting purposes while eliminating the risk of any performance impacts to the CAD system. Premier UDT provides users the flexibility to acquire CAD data with a wide variety of ad hoc reporting tools.

16e.2.11 Automatic Vehicle Location Server (AVL)

The Advanced Tactical Mapping (ATM) application displays AVL-based unit location data. Premier CAD makes unit recommendations based on current unit status, number of units needed, and relevant CAD system codes. ATM searches outward from the X/Y coordinate of the event to locate the unit or units that match the requirements for recommendation.

Depending on the number of units in an area and the number of units required for the recommendation, the AVL search for closest units occurs in the background and has no effect on the ability for the operator to choose a unit at any time. The Incident Dispatch form provides the standard CAD-based recommendation data when it is first displayed. When the AVL search is complete, the form is updated to reflect the availability of AVL-based recommendation data. The user has ability to use a hot key combination to toggle between the AVL-based and CAD-based recommendations.

Once AVL recommendations are available, the form is updated with two flags on the last line of the form (Figure 29). The first, which replaces the text "Rcmd:" with the text "CAD:" on a yellow background, is meant to draw attention to the fact that the user is currently working with a CAD-based unit recommendation. The second, which adds the red text "(AVL)" after the recommendation list, indicates that AVL-based recommendation data is available and provides the hot key combination to access that data (ALT+V). When the AVL-based recommendation is available, an audit record is also generated to reflect the AVL data.

Units that are provided in the AVL-based recommendation are presented in the normal way, in a black font on a gray background (Figure 30). However, the unit recommendation fields are underlined. A green underline indicates that the recommendation for that unit is truly AVL-based. A black underline indicates either the unit's recommendation is based upon aged AVL data or the most recent dispatch location for that unit. In this last case, the unit recommendation is really based on Last Known Location (LKL).

When AVL has been implemented, the ATM operator can zoom on all units in the main ATM window or magnify on a selected area. Additional information on units is depicted on the geographic display with symbols, colors, and labels. Each unit type in Premier CAD is assigned a symbol for the ATM geographic display. Each unit status category in Premier CAD is also assigned a color in ATM. Each unit in ATM is labeled with the Premier CAD unit ID. If multiple events or units are at the exact same address location, they are geographically dispersed by ATM automatically.

With ATM, the unit icons truly resemble the type of unit so dispatchers can easily visualize what types of units are located where. Icon size for a unit is automatically adjusted as the scale of the map changes. Unit ID's are displayed directly beside each vehicle on the geographic display. These features are configurable by the customer.

ATM has the capability to track selected units. The user can simply choose the unit icon from the toolbar and a list of all the units appear and the user checks those units they want to track. All units selected are tracked in the selected window of ATM (Figure 70).



Figure 70. ATM Selected Window

16e.2.12 Phase II Compliant

The ATM product interfaces to other systems via a communications server, which uses TCP/IP or serial messaging. ATM is capable of two-way messaging and already supports approximately twenty different message formats. These formats are currently used to interface to CAD and AVL systems. Motorola expects to add additional message formats for integrating to other systems long term.

Premier CAD and Premier ATM are Phase II compliant. With ATM, users can pinpoint the location of the cell site on the map to immediately determine an approximate location of the call. When a 911 Cellular call is received, the CAD system sends the cell phone triangulated coordinates to ATM and the callers location is spotted on the map.

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