



California Department of Forestry and Fire
Protection

Computer Aided Dispatch System

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Category: Business Continuity and Disaster Recovery





Executive Summary

The men and women of the California Department of Forestry and Fire Protection (CAL FIRE) are dedicated to the fire protection and stewardship of over 31 million acres of California's privately-owned wildlands. In addition, the Department provides varied emergency services in 36 of the State's 58 counties via contracts with local governments. The Department's firefighters, fire engines, and aircraft respond to an average of more than 5,600 wildland fires each year which burn more than 172,000 acres annually. CAL FIRE also answers the call more than 300,000 times for other emergencies each year.

California has the greatest firefighters in the world. In support of these ground forces, the CAL FIRE emergency response air program includes 23 Grumman S-2T 1,200 gallon airtankers, 11 UH-1H Super Huey helicopters and 14 OV-10A air tactical aircraft. From 13 air attack and nine helitack bases located statewide. Even though we have these great resources the way we dispatched these fantastic firefighters and their supporting resources was badly flawed. The legacy dispatch system was not scalable, meaning it could not process increased number of calls. Its interface was cumbersome causing operational and training delays. It was becoming obsolete being unable to interact with Geospatial Information Systems (GIS) technology or share dispatch information with other emergency responders. In other words, the legacy dispatch system has a number of operational inefficiencies which inhibited a timely response to emergencies.



Working with a rigorous project management methodology, CAL FIRE with the help of systems integration and solutions vendor Northrop Grumman (NGIT) implement a modified computer-off-the shelf CAD system. The new CAD system was installed in all 21 units dispatch units at an approximate cost of \$25.7 million, in June of 2007. The project team developed an outstanding application that meets, and in many cases exceeds, the original operational expectations of the department.

The Computer Aided Dispatch (CAD) is a critical aspect of disaster recovery in California. It not only gives dispatchers more accurate information on the location of an emergency, but it allows decision makers to quickly and accurately dispatch the correct number of firefighters and their supporting resources to the scene of an emergency. The technology can also interface with other dispatching systems which increases communication between local, state, and federal emergency response teams.

Wildfires are the greatest natural threat to California's citizens and prosperity. They are also more easily contained the quicker they are responded to. These two facts are what make the CAD system a worthwhile investment. Decreasing the response time, and increasing the response accuracy to an emergency hedges California against the personally and economically destructive potential of a wildfire.



Description

Business Problem

The California Department of Forestry and Fire (CAL FIRE) is the premier fire fighting and emergency response entity in California. It protects the people of California from fires, responds to other emergencies, and protects and enhances forests. With more than 5,600 wildland fires and 300,000 other emergency responses a year, CAL FIRE employees depend on effective Command and Control procedures to make sure the right people, and the right equipment are going to an emergency call. The primary element of CAL FIRE's Command and Control structure is its dispatching system. Dispatching requires matching resources to needs and prioritizing incidents based on urgency. The sheer number of emergency calls – in addition to the geographic scope of CAL FIRE's service area – makes this a difficult proposition.



In 2002, CAL FIRE concluded that the legacy Computer Aided Dispatch (CAD) system could no longer meet the needs of the department or the expectations of the public. Specifically, the following problems with the legacy CAD system were identified:

- It could not effectively process the increased volume of emergency calls, causing delays and errors in the dispatching process.
- It used technologies that were obsolete, and could not be readily adapted to emerging business practices and processes.
- The legacy system prevented the easy exchange of critical command and control information between operators and the regionally distributed command centers.
- It lacked robust disaster recovery functionality and business continuity features.
- The user interface was both cumbersome and inefficient, causing training and operational difficulties.
- The legacy system relied on manual map processes and did not integrate with GIS-based systems resulting in inaccurate locations and dispatches.
- It prevented the critical and timely dissemination of CAD data to other state and federal departments (i.e. California Office of Emergency Services and National Forest Service).

These problems represented a serious risk to CAL FIRE business goals and consequently the safety of Californians.



Forming a Solution

After extensive deliberation, CAL FIRE selected systems integration and solutions vendor Northrop Grumman (NGIT) to implement a modified computer-off-the shelf CAD system. Due to the complexities of maintaining and integrating a CAD system within the department and other government agencies, CAL FIRE determined that a modified computer-off-the shelf solution was best for the core dispatching activities and to custom build solutions for data exchange interfaces and reports with state IT staff. This decision was made for several reasons:

- The vendor (NGIT) would be responsive to CAL FIRE business and technical requests at all hours of every day.
- The solution provided would be a CAD system that is highly sustainable.
- CAL FIRE would be able to build and enhance this product with customizations, significantly increasing data communications between local, state, and federal partners.



CAL FIRE staff – working in conjunction with the vendor – followed a rigorous project management methodology (PMBOK) to increase collaboration between the geographically dispersed project teams and ensure that this critical disaster preparation was installed and functioning as soon as possible. Stakeholder meetings with IT and business leaders, visits to each of the 21 project units, an open communications plan, and visible and active executive sponsorship contributed to the success of the project and marketing efforts. An independent verification and validation (IV&V) vendor reporting the California Department of

Finance oversight section (now the Office of the CIO) provided the necessary oversight and assisted CAL FIRE management with project stewardship. In other words, a solution this critical to the all-important task of disaster and emergency response had to be and was managed in the most effective and efficient way.

As of June 2007, all 21 units successfully implemented the new CAD system at an approximate cost of \$25.7 million, and the project team developed an outstanding application that meets, and in many cases exceeds, the original operational expectations of the department.

Description of Solution

The solutions architecture is based on an N-tiered client server model with application and database servers running in a Windows environment. In the event of a large geographic disaster, like the 2007 wildfires, the CAD system is designed to operate independent of a centralized location, ensuring there is always an effective command and control function. Because part of the department's responsibilities is to respond to emergencies, this design is crucial. Utilizing methodologies similar to military command and control functions, the system can adapt to changing circumstances and heal as needed to cover any disaster, ensuring the public need and safety are met when the system is needed most, under extreme and adverse circumstances.



The CAD system consists of the following software technology components:

- Altaris Computer Aided Dispatch
- Altaris Management Information System
- Supporting Altaris GIS applications
- Operational recovery and business continuity systems
- A robust reporting sub-system



The CAD governance model follows industry best practices which culminate in robust communication and cooperation between the vendor, state fire protection personnel, and Information Technology staff. Even with the CAD system in full production mode, CAL FIRE instituted the following project management procedures and support structure to ensure ongoing successful operations:



- An active steering committee
- Robust configuration and change management practices
- 24*7*365 in-house and vendor support
- Problem tracking and issue resolution application and database
- Online Web access to reports
- Vendor contract management

Significance of Computer Aided Dispatch

The new CAD system significantly improves government operations in the following areas:

- The new CAD system processes more than 300,000 emergency calls annually without performance degradation.
- The new system architecture can easily be enhanced to utilize benefits from emerging network and hardware improvements.
- The current hardware platform now provides fault tolerance, which minimizes the risk of system down-time in the event of a catastrophic hardware failure.
- The new design reduces the learning curve of new dispatch employees, improving interaction with the public and increasing the management capabilities of CAL FIRE business leaders.



- The new CAD application interfaces with GIS technology and greatly assists the dispatcher with the exact location of the emergency and best route to the incident, improving the accuracy and timeliness of emergency response.

The new CAD system also improves disaster coordination and early response by dramatically expanding internal and external CAL FIRE communications:

- The CAD to CAD interface ensures that vital information flows between different CAL FIRE units.
- The CAD to Resource Order and Status System (ROSS) interface enables CAL FIRE to communicate with the national fire resource ordering system, improving the dispatch process when large scale events occur, and federal assistance is required.
- The CAD to California All Incident Reporting System (CAIRS) interface populates a statewide data warehouse to lower costs associated with after action reporting.
- The CAD to External CAD interface enables CAL FIRE to exchange CAD data to co-operators that do not use an Altaris CAD system.



Public Benefit of Computer Aided Dispatch

“I just want to tell you that what made this tragic fire and this catastrophe that we have faced here in this last few days actually doable is because we have had so much help. We have seen, unlike other disasters, we have seen the locals, the state, and the federal government come together in the quickest possible way. There was immediate reaction and action. And so I just want to say thank you very much to the brave firefighters. We have, as I have said many times, the bravest, the best-trained, the best equipped, the smartest firefighters in the world.” – Governor Arnold Schwarzenegger 10/23/2007, at the site of the Southern California Wildfires

CAD betters every aspect that the Governor cites as being critical to wildfire disaster relief. It is interoperable with other systems, allowing CAL FIRE to share its information with federal and local fire fighting and disaster relief agencies. This transferability of dispatch information between all levels of government is critical in a disaster and CAD ensures that the information taken in by CAL FIRE is shared with all potentially helpful parties, and not sequestered in an



obsolete dispatch system. This better government operations not only for CAL FIRE, but all emergency teams responding to a call.

Now, when an emergency 911 call is received, the dispatcher uses the CAD system to accurately and reliably dispatch resources to the site of the emergency, as well as communicate with other emergency responders ensuring optimal responses. Besides an increase in the accuracy of the dispatches, the new CAD system also factors transportation logistics into the dispatch, decreasing the response time once the dispatch has been made. In addition to processing the daily emergency workload calls, the new CAD has been specifically designed to handle the complexities of fighting wildland fires – the greatest natural disaster threat to California’s well being.

The CAD improves CAL FIRE’s reaction time, meaning our best fire-fighting assets – our brave fire fighters – are responding as quickly as possible, hedging the destructive potential of a fire. There are two facts that demonstrate the financial benefits of the CAD program: 1) Estimates of the damaged cause by the 2007 wildfires in San Diego County alone is over \$1 billion. Clearly, wildfires put an enormous strain on the budget. 2) The quicker a fire is responded to, the easier it is to contain and the less damage it does. The new CAD has dramatically improved the initial response to wildland fire situations. With more than 300,000 emergency incidents a year – that threaten life and property – CAL FIRE’s investment in CAD offers an immense return in terms of increasing the public’s safety and well-being.

Since June 2007, when the CAD was fully implemented at the statewide level, the public has greatly benefited from the CAD application in the following areas:

- Improved access to statewide fire emergency services
- Reduction in the average dispatch response time
- Improved ability to quickly respond to devastating wildland fires
- Improved public service levels
- Improved coordination and delivery of fire resources at the statewide level and beyond
- Increased accountability for the timely delivery of emergency services
- Improved emergency recovery by utilizing and analyzing dispatch patterns and events
- CAD is a modified off-the-shelf program so it can serve as a basis for other emergency responders in California